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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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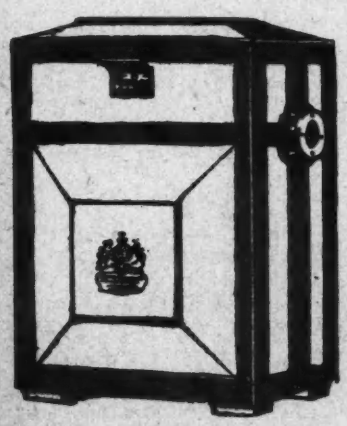

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXLI., No. 2862.] TUESDAY, MARCH 19, 1918. [70TH YEAR.

EDITORIAL NOTES.

Coal Supplies.

RUMOUR is afloat that, through war conditions involving insuperable difficulties of transport, there is likelihood of a curtailment of the supply of coal to London and the South. If there is any foundation for this, it is probable that even gas-works may suffer some inconvenience. In view of the economical use to which coal carbonized in gas-works is put, and the service that is being rendered to the country by gas-works in providing materials for high explosives, fertilizers, &c., it would be a serious thing to reduce their coal supplies before those of householders. Gas is fuel, and so is coke. Coke is an accumulating fuel. Therefore, it is hoped the Coal Controller will see his way to make the use of coke for household and industrial purposes compulsory in place of raw coal, so as to ease the situation as much as may be. If it be true that there are fresh difficulties facing in respect of coal, the Coal Controller should endeavour to ensure that their effect is distributed as broadcast as possible through the country, so as to affect one part as little as possible.

Gas Bills—Promised Statement in Parliament.

THE indications increase that this is going to be a fighting session for the promoters of Gas Bills; but they will have the satisfaction of knowing that it will be a fight for right and progress—right which will include not only moderate justice to stock and share holders, but defence against the current destructive influences upon the prospective interests of the gas industry. It has been seen how local authorities who do not own gas undertakings, but most of whom are interested in electricity concerns, have taken action in opposition to the proposals in the Bills, while at the same time applications are being made to the Board of Trade by electricity undertakings for increases in their maximum prices. Of course, the Board of Trade know full well that in neither the case of gas nor electricity undertakings can the managements help the present position; and the Board, with such an astute business President as Sir Albert H. Stanley, must appreciate that no industry can possibly maintain a firm stand if dividends are allowed to dwindle away to almost nothing in times of such financial stringency as the present. But there are members of Parliament who are, at the instance of opposing local authorities, asking that the Bills shall be read "upon this day six months;" their sense of justice being so faulty that they are hoping to defeat the Bills without even giving their promoters a hearing. This is tantamount to condemning a man without allowing him fair trial, which is not English-like. We think, however, that the Government will not permit the gas companies who have petitioned Parliament for justice to be the victims of the machinations of the local authorities, and be denied a complete hearing. That this is their intention seems clear; for the Chairman of Committees (Mr. Whitley), in putting down the Gas Bills for second reading *pro formâ* to-morrow, told the House last Thursday that he did so in the expectation that the President of the Board of Trade would then be in a position to state the method on which it was suggested to deal with so much of the Bills as concerned the statutory price of gas. This shows that the Government believe the Companies have a case for judicial determination, and not one that has so little obvious merit and so much demerit that it should receive the summary rejection that certain members of Parliament, acting as the instruments of opposing local authorities, consider should be meted out to the appellants to Parliament. It would, however, appear from the references to the matter in the House [see "Parliamentary Intelligence" to-day] that the question of the price of gas and dividend is not the only one against which there is opposition. Some of the members indicated that other matters were of local importance; and they wished to discuss them in the House. From what Mr. Whitley said, the Government are disposed to give every facility for both sides to have their say, whatever the Bill or the subject; and therefore it must not be anticipated that, beyond the statement by the President of the Board of Trade, and probably a discussion upon it, the second reading will take place to-morrow. However, it is to be sincerely hoped that the preliminaries will not drag on indefinitely.

Supplies to the Ministry of Munitions.

THE gas industry can honestly say, and as readily prove, that it has not indulged in profiteering in any shape or form during the war. It can also assert, with a conscience clear of any idea of slander, that the Government Departments have done their best to prevent anything of the kind, even had there been the desire, by controlling prices at a high level for all the materials needed by the industry, and by regulating at a low level, having in view the costs of materials and labour, those commodities which the industry have for disposal. Therefore it cannot by any stretch of the imagination be laid to the charge of gas undertakings that they have taken any undue advantage of the war in any way, and more particularly where they join-up with Government Departments. As a matter of fact, by private legislation and under the Defence of the Realm Act, they are controlled from head to foot—in one direction, but not unwillingly, through the Explosives Supplies Department of the Ministry of Munitions, who will acknowledge that patriotism has always in the case of most gas undertakings risen superior to self-interest, though at the same time there has been claim in regard to which no right-minded man can impute anything in the way of venality, that the gas undertakings are entitled to fair and not to under payment for what they do.

These remarks are prompted by the revelations of the report, issued a few days ago, of the Select Committee on National Expenditure upon the result of their inquiry into the work of the Ministry of Munitions, which "has become "a vast regulative establishment administering practically "the whole engineering and chemical industries of the "country." The report (an exception may be made of the Explosives Supplies Department) convicts, first, the Ministry of waste—not of a deliberate nature, but through the want of effective co-ordination and unity between the departments—and, secondly, manufacturing firms of making undue profits out of the country in the time of national crisis. Cases are cited not only of engineering companies but of chemical companies who have made extraordinary profits. Among those who have done so in connection with chemical products, gas undertakings cannot be numbered. An example of the profiteering of some chemical firms may be quoted. The amount of profit made in this instance in one year was £51,000. But the paid-up capital of the firm was only £11,250; and on the highest estimate the actual capital employed in the business was £75,000. What justification can there be for such a condition of things as this? It shows, being only an illustration from among many, a large capacity for retrenchment and reform, without loss of efficiency, in connection with the war. But from the point of view of the gas industry the report is incomplete, in that, while producing conviction as to both waste and profiteering,

nothing is said as to the antithesis, which would show that, for certain raw and manufactured materials, prices are being paid which could with all propriety be classified as illiberal. While there could be a good levelling-down, there could also be in other cases a reasonable levelling-up. Perhaps this will be done, if one of the recommendations made by the Committee is accepted and acted upon by the Government. It is that, as soon as possible, a decision should be arrived at as to the rate of profit to be allowed in each industry—due regard being had to the turnover and to the normal profits on capital earned before the war.

Many of the strictures in the report are fully justified. Some of the suggestions in regard to the supply officers may not be—at any rate, not so far as we are acquainted with the officers and their industrious work. The work of the supply officers (*quâ* supply officers) is not in any way disparaged by the Committee. The aim of the officers is production; but it is not their fault that organization has been so incomplete that the financial rope has had an unbusinesslike laxity. Little coherence has existed between supply and finance; but there are one or two exceptions. The Committee expressly acknowledge that good results have been obtained in the Explosives Branch through the close co-operation of the accountants and the supply officers. And, again, "in some cases it is claimed, notably by the "Explosives Department, that the officers of the supply "branches co-operate with the accountants in arriving at "reasonable costs." This is clearly to the credit of the supply officers. But in regard to "reasonable costs," so far as the administrators of the gas industry are concerned, their interpretation of the word "reasonable" will not have quite the same value as that apparently put upon it by the investigating Committee.

There can, however, be full agreement with the view of the Committee that it is not at all desirable that the settlement of prices involving the payment by the State of enormous sums to private firms should be left to the officers concerned with supply, just as it is undesirable that they should be allowed to arrange grants of capital expenditure, or to construct national factories. Production is still the main purpose of the supply branch; and the man who is forcing on production is the last man to whom the settlement of price should be entrusted. Not only is he anxious to tempt the manufacturers to produce, but he is also eager to prevent their services from being engaged by another department. But here we come into touch with a statement that is made by the Committee with which there is partial, but not complete, concurrence, as it seems to us to cast a measure of discredit upon the good faith of supply officers who have been drawn from certain industries, and whose specialized knowledge and experience have been of inestimable service to the Ministry. "In a few cases," remark the Committee, "the heads of departments, and in most cases some of the "responsible officers of the departments, are drawn from "the firms whose industries they control. Even where this "is not the case, it is not improbable that officers of the de-"partments will, through knowledge gained or connections "formed in their official capacity, find their way after the "war into firms with whose industry they have dealt. It is "surprising to your Committee that these considerations "should not have been so obvious as to deter all the depart-"ments—as it has certainly prevented some—from ever "attempting to settle prices. That they have done so "repeatedly is regrettable, but that a tendency should be "established as the practice is, in the opinion of your Com-"mittee, wrong in principle." The principle may be wrong; but there is in what precedes a reflection, without discrimination, upon supply officers drawn from special industries who are doing honourable work, and without a thought of utilizing their position in the national service for creating in any way prospective advantage for themselves. To the men of specialized knowledge and to others who have put, even to the detriment of health, considerable energy into their work, the suggestive remarks will not be palatable, and, in our opinion, they might have been left unsaid without detracting from the value of the report as a whole.

However, to sum up, the intentions of the report are to produce greater coherence in the work of the several departments of the Ministry, and a strengthening of the ties between supply and finance. If the disclosures of the report have their proper influence, and the recommendations are adopted, the purposes of the Committee will no doubt be achieved. At the same time, we must view things in their right proportion. Sight must not be lost of the enormously important part the Ministry of Munitions take in relation to the war; and expectation in connection with an organization of such extensive ramification must not compass perfection of the first water, though admittedly a good ideal to which to strive, so long as time, energy, and money are not wasted in attempting to realize infinitesimal effects.

National Kitchens.

It was amusing to see the coincidence last week of articles in electrical papers on the subject of the supply of electric cooking apparatus to national or communal kitchens. Someone has evidently been beating-up our contemporaries with a view to impressing the electrical case upon the authorities at the Ministry of Food, and to wake-up municipal officials, especially of municipal electricity undertakings, to the virtues of electrical appliances for this special purpose. But the coincidence of the articles and the similarity of the case presented will not be the least striking feature of these effusions in the eyes of Alderman C. F. Spencer, the head of the Department for National Kitchens at the Ministry of Food; and it will not require a large amount of perception on his part to see through the thin film of virtue to the solid truth which lies beneath, and which is a compound of factors of which our electrical friends think the less said the better, or, if referred to at all, it should be in general rather than in exact terms. This simultaneous waking-up in the Electrical Press over our National Kitchens is probably explained by the "Electrician," when it says that it understands the gas interests have seen the importance of the subject, and are doing all in their power to introduce gas cooking for the purpose. It is unkind of the "Electrician" to pointedly call attention to this, in view of its close commercial association with gas, which should claim from it strict impartiality.

We are aware that the manufacturers of gas-cooking apparatus have this question well in view; and what is more (they know their own strength) are not making any secret of the fact, as will be seen by the remarks of Mr. H. M. Thornton, at the meeting of one firm of makers, as reported in this issue. He was speaking only for his firm, and not for the several others who are also doing a considerable amount of work in large-type plant. He spoke of the equipment by his own Company of the canteen kitchens of several world-famed concerns, and of institutions under national control; also as to the formation of a large Committee of Manufacturers—not gas appliance makers only, but appliances otherwise heated—in order to assist Alderman Spencer in his excellent work. There is no question of one form of appliance or another within the horizon of the Food Department. It is essentially a national work to which its hand has been put, and in which work the interests of any one particular industry cannot, of course, be preferentially studied. The resources of an industry must be an important consideration. The "Electrical Times" laments that makers of electric appliances are so few in number; also that the supply of domestic electric-cookers has slackened off materially the last year or two—"due as much to the "inability of manufacturers to deliver the apparatus, as to "the hesitation of would-be users to incur the enhanced "cost of an outfit and its wiring, to say nothing as to the "increase in the rates for current." National kitchens are wanted more during war time than at any other; and it is just now that electricity is at its worst, in regard to initial, maintenance, and running costs (which, despite what the "Electrical Times" says to the contrary, are higher overall than those relating to gas operation), besides which reliability is in the National Kitchen an important factor. Failures of electricity supply and of appliances at inopportune times are notorious, and require no more than a mention to serve as a reminder. Our "Electric Supply Memo-"randa" need only be consulted to see the electrical testimony on these points that has been offered during discussions on electric-cooking apparatus, but which points are hidden in the articles in our contemporaries by the *camouflage* of extraordinary virtues, and an attempted detraction of those of competitors.

The "Electrical Review" refers to the "noisome fumes" of gas-heated "plant." It does not mention of what these "noisome fumes" consist, nor does it state that a hood fitted with a flue will keep the gas apparatus free from even reproach on the part of the most delicate electrical olfactory organs. Both the "Review" and the "Electrical Times" are concerned over the marvellous capacity of heat elec-

trically generated to do what heat otherwise generated (so they ask the credulous part of the public to believe) cannot do—that is, save part of the shrinkage of meat in cooking. Where or how this distinctive capacity comes in, no electrical man within knowledge has yet seriously attempted to explain; and Alderman Spencer will probably like to inquire why, with equal joints, temperatures, and duration of cooking, meat should lose more through the evaporation of its water constituent in cooking by gas than by electricity. The electrical people mistake their public when they assume a universality of weak intellect and credulity. All charged with the establishment of National Kitchens know full well that meat—which is rationed to-day—is not the only thing which has to be cooked in the oven; boiling operations predominate. For such operations electricity is a slow and costly agent. Where truth prevails or is revealed in the electricity industry, this is frankly acknowledged. A unit of electricity will only give 3420 B.Th.U.; 6 or 6½ c.ft. of gas will give the same number. The average expenditure of coal in this country per unit of electricity generated is 4½ lbs.—some stations doing much better, some much worse. The 4½lbs. is equal to the expenditure of (say) 63,000 B.Th.U. to gain the 3420 B.Th.U. The coal used to produce gas also yields for sale half its weight in coke, as well as tar, materials for high explosives, and many other things needed in the war, and our chief war-time fertilizer, sulphate of ammonia. Food control is linked-up with the earth's produce, as well as with coal control, by seeing that the food control methods assist in putting coal to the very best use to the national advantage. But these things do not appeal to our electrical rivals. They are relying for gaining the business of the National Kitchens upon the degree that the shrinkage-of-meat tale will be swallowed, and upon the influence that the officials of municipal electrical departments can bring to bear upon the local governing bodies who will have a large amount of power in the fitting-up of such kitchens. Thank goodness, gas has a more substantial case, and an array of practical recommendations which must appeal to business men who are not swayed from them by personal influences.

Under the New Order of Things.

While in London and southwards, we are menaced with a greater reliance upon railway-borne coal, with a still further depreciated rolling stock owing to the wagon requirements of the Government in connection with the war, the 12½ p.ct. Churchill bonus, which has caused so much ferment in the ranks of labour, threatens to stir up trouble in the railway world. Under the "auspices" of the National Union of Railwaymen, a conference of shop workers has been held at Derby; and a resolution was passed protesting against the differentiation made in the 12½ p.ct. award, and demanding the immediate extension of it to every railway shopman and shopwoman. To enforce the demand, the claimants will if necessary withdraw their labour. Patriotism is a wonderful force. But it is evident there is a superior force at work among some (thank goodness not all) classes of workers, who would sooner see the country go to the dogs than that they, well paid though they be, should be denied their end. Assuming that the discontented railway shopmen and shopwomen get the 12½ p.ct., we suppose that other grades of railway workers will, as in certain industries, also apply for it. The outside porter and the carriage cleaner may yet emerge as "skilled" workers before they are much older.

To Save Coal through Lighting.

Consternation has been caused among the managements of theatres, music halls, cinemas, &c., by the intimation that has gone forth that from April 1 they are to close at 9.30. It is said that this "in a measure" is due to the Coal Controller (Mr. Guy Calthrop), who is desirous of diminishing as much as possible the amount of coal used for the production of gas and electricity for lighting purposes. The managements of entertainment establishments cannot appreciate the object of this. There are a good many things that we cannot see that are done by Government Departments, and yet there may be a very good reason which cannot be made public behind any such fiat. The Coal Controller may find that he must scrape together all the little economies possible to meet the situation in front of London and the South in order to in the aggregate secure a further reduction in coal transport. With Summer Time coming in next week, the gas and electricity industries have probably more of which to complain than the houses of entertainment; for coal control has from the first been directed to a reduction of their respective businesses. However, the theatre managers cannot see why, with the season of reduced coal consumption upon us, there should be such a proposal just now as the early closing of their houses; and they fear a growth in private illicit entertainment. Perhaps our social habits could be changed a bit, so as to fall in with the new order of things. But there is nothing actually settled yet. The Coal Controller, we understand, proposed to have an interview yesterday afternoon with representatives of the professions and industries concerned. Whether he did or did not do so was not known at the time of going to press.

Gas Coal for Household Grates.

"S.O.S."—that is to say, Mr. S. O. Stephenson—has taken a prominent part in the agitation against the wasteful "control" that sends good gas coal into household grates, and inferior brands into gas-retorts. Last Thursday week, at the meeting of the Southern Association (following up previous efforts), he made an attack upon the system which allows suitability to purpose to be ignored as a factor in coal control. But evidence keeps knocking at his door that his campaign has not yet been wholly successful. Only last Wednesday, the "Worthing Gazette" contained this paragraph: "A consignment of emergency coal was found by the Local Coal Control Committee to be unsuitable for household purposes, being gas coal; and some of the merchants declined to accept it. It was accordingly decided to ask the Gas Company if they would take the three remaining trucks."

Priority and Steel.

Great complaints have at times been made in the gas industry with regard to the little assistance that has been rendered by the powers that be in connection with materials for repairs, renewals, and extensions of plant; and there have been assertions that other industries have fared better. As to this, there is no specific confirmation; for, generally speaking, the other industries, with perhaps less justification than can be shown by the gas industry, have been equally loud in their complaints. The position has been as difficult for those who are placed in a judicial position in this matter, as for those who have had to suffer as a result of their decisions. But what has been, some will say could not be worse. We cannot endorse that. With the increasing intensity of the war, still more material is wanted, and especially steel. Unless, therefore, extensions of plant in which steel is used are required for the supply of gas to an overwhelming extent for munitions or military purposes, it may now be taken to be positively certain that authority for its use will be withheld. Mentioning this gives reminder of the recently issued report of the Committee on National Expenditure, and of these significant words: "When there is a lack of material on every hand, it is essential that there should be the closest check upon its misuse or wastage. The production of munitions already obsolete not only causes wasteful expenditure, but also stands in the way of the production of material which is wanted."

The Oil Situation.

So far as gas oil is concerned, we are assured that, unless there is some considerable change in the situation, it will before next winter be practically unobtainable. As to the general question of home production, the Government are being badgered right and left over the matter of prospecting for oil within the United Kingdom. The subject has been frequently raised in the House; and it is getting quite a favourite topic for discussion by letter writers in the newspapers. The Government withdrew their Bill (which would have given them power to make a survey, and to create a national enterprise, if success attended the search) owing to opposition over the royalty proposal; and they then contemplated proceeding under the Defence of the Realm Act. But there, again, this Act would only protect their proceedings during the continuance of the war. Meantime, as we know, gas-works carbonizing plant is being utilized for the extraction of oils from cannels, and some few plants are being put down adjacent to suitable collieries. Still the Government are being urged from several quarters not to abandon the search for subterranean sources of oil supply. There is plenty of room for doubt. Even those in favour of proving the strata below for oil stores are not certain as to any good result accruing. Some experts express

themselves as confident that nothing worth working will be found. Lord Cowdray—who is head of a firm with great experience in oil, and has gained immense publicity by an offer he has made to the Government—is somewhat vague about the degree of his confidence as to the possibility of finding oil. On the one hand, he says that extensive studies carried out by his scientific staff during the last three-and-a-half years lead him to the conclusion that, notwithstanding the long-established opinion to the contrary, the possibilities of securing a commercial production of oil in Great Britain are of a distinctly promising nature. On the other hand, he holds that no one can say for certain whether or not the United Kingdom will yield oil. This only the drill can prove. But still Lord Cowdray's American expert advisers tell him they "think" that oil will be found in commercial quantities.

An Offer to the Government.

That is the position; and so, if the Government are so minded (and they seem disposed to do something), the best thing they can do is to go forward, and set doubts finally at rest. Whether from patriotic motives, or in the expectation of ultimate benefit, or both, Lord Cowdray, for his firm, has submitted to the Government these alternative offers: (1) For the period of the war, to place at the disposal of the Government, free of all cost, the services of his firm and geologic staff for the purposes of exploration and development. (2) If the Government do not wish to risk public money on what must be deemed a speculative enterprise, the firm are prepared to drill, at their own risk and expense, as licensees, subject to certain areas being reserved to them. This offer commits the firm to a probable expenditure of £500,000. It is a big risk; but the firm may be covering it in the best possible manner by the words "subject to certain areas being reserved to them." What the Government think of the offers has not yet transpired; and they are not evincing undue haste in publicly declaring their views.

Gas Prices at Per 100 C.Ft.

Writing in our "Electricity Supply Memoranda" on Jan. 8 as to the prices of gas and electricity in relation to the difference in value of the units, we remarked: "People do not look with so much resentment upon increases [in price] on smaller units. For example, if in these times the price of gas had been increased by 1d. per 100 c.ft., instead of (say) 10d. per 1000 c.ft., and people had been accustomed to the lower unit, they would not have thought nearly so much of the 1d. per 100 c.ft., as they do of the 10d. per 1000 c.ft." Following this, we are glad to see that Mr. William Chew, of Blackpool, is now quoting gas at per 100 c.ft., instead of at per 1000 c.ft., and is thus leading the way in a reformation which for the layman makes contrast with electricity so much easier. For instance, he advertises gas at 4d. per 100 c.ft. through slot meters, at 3½d. through ordinary meters, at 3d. through power meters, and at 4d. for motor bags—6d. at week ends. He also points out that 100 c.ft. of gas yields 50,000 BTh.U., while 1 unit of electricity only gives 3420 B.Th.U. He might have added that for lighting a unit of electricity with ordinary metallic filament lamps will only give 800 candle-hours, and the so-called "half-watt" lamp about 1420 candle-hours; while with an ordinary inverted gas-burner 2000 candle-hours can be realized per 100 c.ft., and with a good type burner and composition of gas 2500 candle-hours. However, the great point is that 100 c.ft. of gas supplies a unit which brings the prices nearer to those charged for electricity, though still not disclosing the great disparity of value in service in favour of gas. If it were not for the inconvenience, we might sell heat units, candle-hours, and horse power; and then users would know what value they were paying for, and naturally patronize the cheapest agent.

The Demand for Gas-Furnaces.—Referring to the position in the engineering trade, the Davis Furnace Company, of Luton, write that, during the last couple of months, they find that the character of the demand for furnace plant has totally changed. Whereas for the last two months of 1917 about 85 p.ct. of their orders were for crucible furnaces for metal melting (for which particular type they had a quite unprecedented demand), for the first two months of this year the position is reversed. Now at least 80 p.ct. of their orders are for furnaces of the oven type—principally for heating steel billets and plant for tool-making purposes. Increased pressure on contractors by certain Government departments is, they add, accountable for the change, which shows the difficulties of heating specialists endeavouring to forecast for many weeks ahead the probable class of demand.

THE SCOTTISH GAS COUNCIL.

List of Office Bearers and Members.

We have received from the Secretary, Mr. J. W. Napier, of Alloa, the list of the office-bearers and members of the Scottish Gas Council; and it is given below. In his covering letter, Mr. Napier says the Executive Committee is the whole Council; and the reason is that this arrangement is the best in the meantime, and until the annual meeting in October, when a reduced number will be appointed.

SCOTTISH GAS COUNCIL.

President:

Bailie J. C. Drummond, Convener of the Glasgow Corporation Gas Committee.

Vice-President:

Samuel Milne, Aberdeen Corporation Gas-Works.

Secretary:

J. W. Napier, Alloa Corporation Gas-Works.

Members:

S. Douglas Elliot, Convener, Edinburgh and Leith Gas Commissioners.
Alex. Masterton, Manager, Edinburgh and Leith Gas Commissioners.
Bailie Drummond, Convener, Glasgow Gas Corporation.
Alex. Wilson, Manager, Glasgow Gas Corporation.
Bailie High, Convener, Dundee Gas Corporation.
Alex. Yuill, Manager, Dundee Gas Corporation.
Councillor G. D. Mackenzie, Convener, Aberdeen Gas Corporation.
Samuel Milne, Manager, Aberdeen Gas Corporation.
Bailie George Henderson, Convener, Paisley Gas Corporation.
G. R. Hislop, Manager, Paisley Gas Corporation.
Dean of Guild Muirhead, Convener, Falkirk Gas Corporation.
William Wilson, Manager, Falkirk Gas Corporation.
Bailie Paterson, Convener, Greenock Gas Corporation.
George Keillor, Manager, Greenock Gas Corporation.
Ex-Bailie Slorach, Convener, Hamilton Gas Corporation.
John Ballantyne, Manager, Hamilton Gas Corporation.
A. S. Legat, Chairman, Coatbridge Gas Company.
George Braidwood, Manager, Coatbridge Gas Company.
George Kinross, Chairman, Stirling Gas Company.
J. M. Smith, Manager, Stirling Gas Company.
Z. H. Heys, Chairman, Barrhead Gas Company.
J. W. Carmichael, Manager, Barrhead Gas Company.
Ebenezer Dawson, Chairman, Dalkeith Gas Company.
Robert Cowie, Manager, Dalkeith Gas Company.
James Dickson, Gas-Works, Johnstone.
David Fulton, Gas-Works, Helensburgh.
Lawrence Hislop, Gas-Works, Uddingston.
Jas. D. Keillor, Gas-Works, Hawick.
John Lang, Gas-Works, Alexandria.
Robert Muir, Gas-Works, Galston.
J. W. Napier, Gas-Works, Alloa.
P. L. Readdie, Gas-Works, Leven.
Allan Reid, Gas-Works, Brechin.
John Richmond, Gas-Works, Penicuik.
J. B. Scott, Gas-Works, Cowdenbeath.
Robert Simpson, Gas-Works, Cambuslang.

Executive Committee.

The Whole Council.

Representatives on the Executive Committee of the National Gas Council.

Lawrence Hislop, Uddingston. | J. W. Napier, Alloa.

RELATIONS BETWEEN EMPLOYERS AND EMPLOYED.

Two Further Reports.

Within the last few days there have been issued by the Ministry of Reconstruction two more reports of the Committee on Relations between Employers and Employed—the Chairman of which is the Right Hon. J. H. Whitley, M.P.

One of these is the second report on Joint Standing Industrial Councils, which follows what has now become generally known as the "Whitley Report." This later one, it is understood, is now receiving the joint consideration of Dr. Addison and the Minister of Labour, in the light of the practical experience which has been gained in establishing Joint Industrial Councils in accordance with the proposals of the first report. The present document deals with industries in which organization on the part of employers and employed is less completely established than in the industries covered by the previous report, and with those in which such organization is weak or non-existent. The first report advocated the establishment for each industry in which organization is sufficiently developed to render the existing associations of employers and employed representative of the great majority of those engaged in the industry, of an organization to be called a Joint Standing Industrial Council (with District Councils and Works Committees), which should be representative of both parties, and should have as its object the regular consideration of matters affecting the progress and well-being of the

industry, from the point of view of all engaged in it. The present report suggests for the second (or less organized) group the application of proposals in the main similar to those advocated for the first, but with the additional proviso that, where a National Industrial Council is formed, there should be appointed one or two official representatives to assist in an advisory capacity, and serve as a link with the Government. For such industries, there might be also District Industrial Councils—acting in conjunction with the National Councils, where such a Council was formed. As to the standard of organization in any particular industry which would justify a National Council, the case of each industry will have to be considered separately; and it is desirable to leave the matter to the decision of the Ministry of Labour and the organizations concerned.

With regard to the third group (in which no existing associations can be said adequately to represent those engaged in the industry), in place of National or District Industrial Councils, the machinery of the Trade Boards Act might well be applied, pending the development of organization. But for this purpose, certain modifications are needed to enlarge the functions of the Trade Boards. They should be empowered to deal, not only with minimum rates of wages, but with hours of labour and questions cognate to wages and hours; and they should also be enabled to initiate and conduct inquiries on all matters affecting the industry or section of the industry concerned. Where an industry in this group became sufficiently organized to admit of the institution of National and District Councils, these bodies should be set up on the lines already indicated.

Most of the industries in the first two groups have sections or areas in which the degree of organization falls much below what is normal in the rest of the industry; and the Committee recommend that, on the application of a National District Council sufficiently representative of an industry, the Minister of Labour should be empowed, if satisfied that the case is a suitable one, to make an Order either instituting for a section of the industry a Trade Board on which the National Industrial Council should be represented, or constituting the Industrial Council a Trade Board under the provisions of the Trade Boards Act. Briefly, the proposals are that the extent of State assistance should vary inversely with the degree of organization in the industries. The Committee say that the expression "employers and workmen," as used by them, covers State and municipal authorities and persons employed by them. The proposals now set forth do not need legislation, except as regards the extension of the powers of Trade Boards, and giving authority to institute a Trades Board for sections of an industry.

Whether in industries in the unorganized group the establishment of Works Committees is to be recommended, is, the Committee remark, a question which calls for very careful examination. In fact, the general question of Works Committees forms the subject of the other report which has just made its appearance. In this, it is pointed out that in every industry there are certain questions, such as rates of wages and hours of work, which should be settled by district or national agreement; and with any matter so settled, no Works Committee should be allowed to interfere. There are also many questions closely affecting daily life and comfort in, and the success of, the business, and affecting in no small degree efficiency of working, which are peculiar to the individual workshop or factory. The purpose of a Works Committee is to establish and maintain a system of co-operation in all these workshop matters. The Committee refrain from indicating any definite form of constitution for the Works Committees; believing that the greatest success is likely to be achieved by leaving to the representative bodies of employers and employed in each industry the maximum degree of freedom to settle for themselves the precise form of Committee to be adopted. They, however, remark that the Committees should not, in constitution or method of working, discourage trade organizations. The Committees should meet regularly, and always keep in the forefront the idea of constructive co-operation in the improvement of the industry to which they belong; they would fail in their main purpose if they existed merely to smooth-over grievances.

A suggestion that the Ministry of Labour should prepare a summary of the experience available with reference to Works Committees, and issue a memorandum thereon for the guidance of employers and workpeople, has been acted upon; and the memorandum is to be published immediately.

Water Lubrication of Gas-Exhausters.—*Apropos* of the recommendation to use water in place of oil for the lubrication of exhausters [*ante*, p. 452], M. Guillet writes to the "Journal des Usines à Gaz" confirming the success of this practice from his experience. A steam-driven Beale exhauster, put into use new in October, 1910, has been lubricated in this manner, and without having once been out of service, manifests no appreciable wear after having passed over 1000 million c.ft. of gas. The lubrication has been by syphons delivering town water of great purity; but in general practice, according to M. Guillet, it is better to use ammoniacal liquor, since a hard water, under the action of the ammonia and carbonic acid in the gas, forms a deposit in the circular passages, causing a blockage and calling for dismantling and scraping. With ammoniacal liquor, this nuisance does not occur. Exhausters lubricated in the way named have kept in excellent condition; the interior surface taking a high polish.

ELECTRICITY SUPPLY MEMORANDA.

PERHAPS those amiable gentlemen who in the House of Commons are trying to block the efforts of certain gas companies to get a modest dividend on their capital with war conditions straining to prevent them achieving anything of the kind without the assistance of Parliament, might note that electric supply companies are proceeding with somewhat similar applications to the Board of Trade. Local authorities who have petitioned against the measures of relief sought by gas companies might also note the same point. The electricity companies do not, it might also be observed, work under a sliding-scale; but they all operate under the restriction of a maximum price. There is not, however, the slightest compulsion for them to reduce their dividends if the maximum price allowed will yield sufficient profit. Moreover, they produce nothing the dealings in which, and the prices of which, are controlled by Government as is the case with the gas companies. Nor do they manufacture materials for the provision of high explosives, nor fuel oil for naval, aeroplane, motor, and other purposes. The case for gas companies is, therefore, infinitely stronger than that of electricity companies. There are matters in connection with these applications that will interest the gas companies who are applying to Parliament. For example, the Board and representatives of the companies have been in conference. On the occasion a suggestion was made that a general Order should be issued regarding the increase of maximum prices; but the Board have determined that such a course is not practicable, and that each case must be considered on its merits under the procedure prescribed by the applying companies' Acts and Orders.

To Increase Maximum Prices.

Information Wanted by the Board.

There are other matters of interest. The Board have promised to deal as expeditiously as possible with any application for revision that may be received; but the following information is to be supplied: (1) The amount of dividend paid on the ordinary shares for each of the last five years of account. (2) A comparative statement of receipts and expenditure for the last five years respectively. (3) The proportion of energy supplied respectively: (*a*) Under contracts with controlled establishments. (*b*) Under long-term contracts. (*c*) To ordinary consumers: (1) For lighting, and (2) for power, with a statement of the prices now charged in respect of each class of supply. (4) The increase in revenue charges per unit generated attributable to increased cost of wages, fuel, oil, and plant since the outbreak of the war—exclusive of the increase of wages due to the recent award relating to the 12½ p.ct. bonus. (5) What the recent 12½ p.ct. bonus award will represent per unit generated. The Board do not intend applications to hang about indefinitely through any antagonism on the part of local authorities, most of the trading members connected with which bodies have, it is safe to say, taken precious good care to put up the prices of the commodities in which they deal with the view to getting a fair—perhaps a very good—profit on them. Notice of applications is to be given to local authorities in the areas of supply; and the Board will consider any representations made to them if they come along within fourteen days from the date of the notice. Any objecting local authorities will have to look sharp after applications are made, if they wish to put in protests.

Charges on Non-Flat Rate Systems.

In connection with charges on the maximum demand system, the Board in their instructions enunciate a principle which, it is hoped, will be enforced not only during war time, but in ordinary times. The Board state that, in relation to charges on the maximum demand system, they are of opinion that any general percentage increase which may be added to the consumer's account to cover war contingencies should not be taken as infringing the provisions referring to maximum price contained in the companies' Acts and Orders, *provided that the average charge per unit to any consumer does not exceed the maximum prescribed*. It is just as well to have this principle laid down, as cases have been known where—under the Norwich or rateable value system of a lump sum, and so much per unit consumed, and the current is only used sparingly (say) for lighting purposes—the average charge per unit has worked out to considerably more than the maximum allowed in Act or Order. The managements of the electrical undertakings have discreetly said nothing as to this; but the concerns have pocketed the average higher charge than the legal one without the slightest remorse. There are some quarters in the electrical industry where it takes a lot to disturb consciences.

Equal Distribution of War Costs.

Talking of prices, it was seen a fortnight ago that the Ministry of Munitions are favourable to electric energy contracts of all kinds—long term, short term, or ordinary—being revised so that all consumers should share in bearing the burden of the augmented costs due to the war. This is only right, though at the beginning of the war there were feeble little screeches from certain electrical men over any proposition to increase the charges for power, heating, and cooking. They wept

over the reactionary idea that these customers should be called upon to pay more; and their sense of justice was marked by the suggestion that the lighting consumers should have placed upon them the whole of the additional burden. There were people, too, who asked what did it matter if there were losses and the ratepayers made up the deficiencies. Better this, said these worshippers of inequity, than that the tender flowers of cooking and heating by electricity should perish through being choked by the infliction of an additional fraction of a penny on the price of the current. The Ministry of Munitions have recognized the propriety of all customers bearing their share of the cost. The Electric Supply Committee of the Birmingham Corporation hold a similar view. They have again revised the scale of charges to electricity consumers; the increase being approximately 15 p.ct. on the present scale of charges, which came into force last Michaelmas for low-tension supplies. Now the Committee, finding that the Government Departments are sympathetic over the revising of pre-war and long-term agreements with a view to these bearing an equitable share of the wartime burdens, point to the obvious —that the extra costs of production and supply should in equity be borne by all classes of consumers. The folly of limiting in contracts the variation of price to a coal clause only is proved by the changes that have taken place in wages and in other directions. In the case of the Birmingham high-tension and traction supply, the extra cost of fuel is provided for by such special provision; but the other higher expenses are not. This, not only in Birmingham but elsewhere, must be guarded against in future. To deal with the anomaly at the present time, under the encouragement given by the Government Departments, the Birmingham Committee are proposing to raise by 10 p.ct. the prices charged for high-tension and traction supply; and this after taking into account the coal clause. This is a rational course; for the war time extra cost of production ought, as has all along been contended in the "Memoranda," to be borne equally by all consumers. It is the only fair way.

Lighting Topics.

Mr. Haydn T. Harrison, the Illuminating Engineer with a strong tendency on the electrical side, is now Lieut.-Commander in the R.N.V.R.; and in this capacity he has been devoting his technical knowledge to researches and experiments into the suitability of various light sources for projection purposes. We wish him abundant success in this capacity. He has recently been regaling the members of the Illuminating Engineering Society with information on the subject of directing and concentrating light. One or two side-issues refer to commercial lighting. He warned those of the members attached to the electrical branch of illumination that it is probable increased efficiency in electric-lamps will result only through increased intrinsic brilliancy. He submitted that the intrinsic brilliancy of electric-lamps is already greater than can be permitted as naked light sources. This is an admission from an electrical engineer that has commercial interest, because it means that the filaments must be screened, and the efficiency—gauged by illumination per unit of energy used—be reduced. If this be so now, then any progressive efficiency will mean much more drastic treatment to render the lights innocuous to the eyesight. Thus Mr. Harrison suggests that, if much of the efficiency gained is to be usefully preserved, it will be necessary to study carefully the laws of reflection and dispersion. This is obvious. But it only shows that progress in lighting efficiency per unit of energy consumed brings greater harmful conditions in its train, against which there can only be voluntary protection. Many electrical engineers do not pay any attention to this, so long as the ignorant user does not raise any objection. There is one incidental remark by Mr. Harrison with which we do not agree. He says that it is interesting to note that the progress of gas illumination is largely due to the composition of the gas mantles, which, owing to the proportioning of the constituents, have improved nearly 50 p.ct. Since when? This is news to us. The making of mantles has, of course, greatly improved; but if Mr. Harrison knows anything about flame temperature, he will look in another direction for the improvement in the lighting efficiency of mantles. While referring to lighting questions, it may be noted that nearly every week brings intelligence as to the substitution in street lighting of electric incandescent lamps for arc lamps. It is noticed, among other instances, that, at a recent meeting of the Tottenham District Council, it was agreed, having regard to the fact that the supply of carbons for electric arc lamps is becoming exhausted, to replace the arc lamps with incandescent ones The estimate of the Electrical Engineer is that a saving of £1000 per annum will be effected.

The Sensitive Electric Meter.

The electric meter is a box of mystery to most electricity consumers; few can read it. Consumers need to have great faith in the meter readers, and swallow what they choose to book as the consumption. Meter readers are not infallible; and modern history has recorded long-continuing errors that have required considerable financial adjustment. But the mistakes of electric-meter readers are not the only ones that are encountered. The meters themselves are very sensitive subjects. They do not like great variations of temperature. They should be tenderly guarded in this respect, and be fixed somewhere where all the year round they can be kept at a fairly uniform temperature. Mr. G. W. Stubbings, writing in the "Electrical Review" on the "Temperature Effects in Direct-Current Meters," states that a temperature variation of 3° C. will cause an alteration of about 1 p.ct. in the accuracy of an unshunted mercury meter. To compare the performances of two such meters, the one fixed in the living room of a house, or in a cupboard leading out of the room, and the other in the basement, the average temperature of the first in the winter months during its hours of working will be in the neighbourhood of 20° C., while the temperature of the other may average not more than 8° C. As the difference in temperature will be 12° C., there will be 4 p.ct. difference in the accuracies of the two meters. It is interesting to get the authoritative testimony of Mr. Stubbings on this question.

"Cricket!" in the "Electrical Times."

Recently there was occasion to correct certain statements as to the pressure and calorific value of gas (through war time troubles) made by an electrical writer [see Jan. 29, p. 199]. Now the writer of "Cooking and Heating Notes" in the "Electrical Times" makes some random assertions regarding pressure and calorific value without in any way attempting to justify them. There are gas undertakings, but far from a majority of them, that have had, through extraordinary demand and other war time difficulties, to reduce pressures—not continually, but intermittently. The critic, in the note before us, says that both gas and electrical undertakings, owing to the growth in demand exceeding the rate at which extensions to plant and mains can be carried out, are suffering from inability to maintain full pressure at all times. There have been cases where pressure has been reduced through certain night incidents. But the critic adds that unfortunately in the case of gas the calorific value as well as the pressure is affected, with the result that cooking "on occasions" can only be carried out with difficulty, and always with slowness. Now we ask him, if he is animated by any sense of fairness, to explain to his readers why the calorific power is reduced, and also to say if he knows of any cases where the calorific value of gas has been lowered by more than a moderate percentage owing to the work being done for the nation in providing the high explosives essential to the war. If so, we challenge him to name them. Our own experience and that of members of our staff in various localities, do not support the assertions. However, we should rather have thought the critic would approve of the "slower cooking," in view of the most wonderful saving of shrinkage of meat that, according to electrical teaching, ought to result from lower pressures and temperatures. Apparently he does not approve of the gas-cooker intruding upon the vaunted practices of the electric-cooker. He also refers to a notice recently issued by the Aerated Bread Company, asking for the forbearance of their customers "should they *occasionally* be kept waiting for hot dishes, &c.;" delay being attributed to "the present low pressure of gas coupled with its reduced heating quality," which "make it difficult to serve customers with the usual promptitude." Now whether or not the "A.B.C." are right in regard to the reduced heating quality, they atall events are fair. The announcement shows plainly that any part that gas may have in the delay is only temporary. It performed its functions with promptitude before. They also acknowledge in the words "should they occasionally" that the difficulty is not continuous. The Gas Light and Coke Company were not responsible for the issue of the notice nor its framing; and we are quite certain the British Commercial Gas Association were not. The critic suggests that one or the other may have been. For electrical competitors to try to degrade the gas industry by utilizing the difficulties brought about by national service which they cannot themselves render is the height of meanness; and we are sorry to see the columns of the "Electrical Times" given up to such a purpose.

Concrete Mixtures for Ferro-Concrete Work.—In the paper he read before the Society of Engineers on Monday of last week, Mr. T. J. Gueritte dealt with "Concrete Mixtures for Ferro-Concrete Work, with Special Reference to the Influence of the Percentage of Voids in Aggregates," considering and comparing the various mixtures usually specified in Great Britain. He said that the quantities of materials, aggregate, sand, and cement, required to make a cubic yard of concrete of the various mixtures may vary by as much as 15 p.ct., according to the percentage of voids in the sand and the aggregate. Ascertaining this percentage is, therefore, of much greater interest than seems generally recognized, as far as the cost of concrete is concerned. The consideration is of great importance when selecting the aggregate to be used. It is actually cheaper to employ well-graded broken shingle costing 7s. 9d. per cubic yard and containing 42 p.ct. of voids, rather than crushed stone costing only 6s. a cubic yard, but containing 52 p.ct. of voids owing to its flaky nature. The influence of the voids is considerable also as regards the porosity and the strength of concrete. The general concensus of opinion among engineers is that good work cannot be obtained unless the excess of cement and sand mortar over the net amount of voids in the aggregate is at least 10 p.ct. A special clause for use when the voids in the aggregate exceed 50 p.ct. removes all danger of failure, and insures that there is always a sufficiency of mortar in the concrete. Such a clause should be adopted in all specifications; and it is desirable that engineers and contractors should make a more regular practice of checking the percentage of voids in the materials used on their works.

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Compagnie Royal Asturienne des Mines, Spain.
Leeds Gas-Works.
Manchester Gas-Works.
Croydon Gas-Works.
Gas Light & Coke Co.—
Beckton Works.
Kensal Green Works.
Fulham Works.
Liverpool Gas-Works.
Melbourne Gas-Works, Australia.
Brentford Gas-Works.
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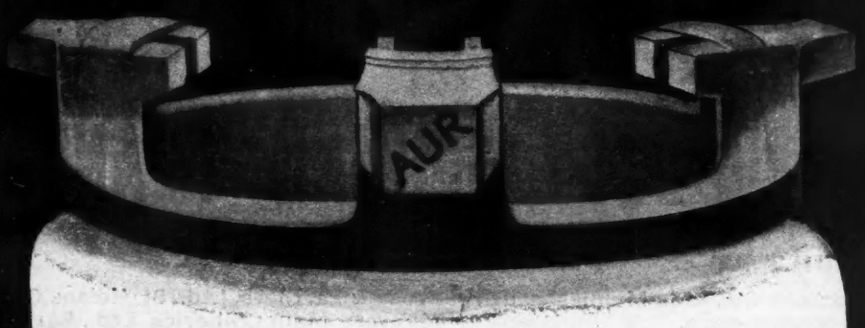

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THE GAS INDUSTRY AND HOUSING.

By THOS. NEWTON.

ALTHOUGH the blighting effect of the war unfortunately overshadows every sphere of activity at the present time, there are indications that the work of reconstruction is beginning to receive serious consideration. Among the many schemes of reconstruction that are cropping-up on every hand is the housing problem; and it is certain that much thought and attention will have to be devoted to this important problem in the near future.

THE SHORTAGE OF HOUSES.

The magnitude of the problem may be readily appreciated when the tremendous shortage of houses is taken into consideration. It is variously estimated that at present there is a shortage of from 200,000 to 250,000 houses; and while either figure may be regarded as a practical estimate, there are social reformers who would willingly double the former figure, and contend that this should be regarded as the minimum. The housing problem is generally referred to as a single problem; but, of course, many problems—social, industrial, economic, engineering, and architectural—are involved. Each of these, in turn, is surrounded with its little group of minor problems.

PROBLEMS AFFECTING THE GAS INDUSTRY.

The main problem affecting the gas industry is the supply of gas to all the houses which are to be built. Whether the potential supply is to be little or much depends largely on the foresight, imagination, and broadmindedness of the industry. Splendid opportunities lie immediately ahead; and these should be taken advantage of to the fullest possible extent. We have been regaled from time to time in the newspapers by laymen as to the wonderful part electricity is destined to play in the housing schemes of the future. Fantastic visions of electric cookers, heaters, and wonderful contrivances for the yielding of abundant supplies of hot water have been conjured up. Alas! practical electricians know to their sorrow that these are only visions, which, in the nature of things, are not capable of materialization. With gas, it is happily otherwise; for there is nothing in this direction which electricity can do, that cannot be done better, quicker, and cheaper by gas. It is just as well, however, to keep these facts prominently before the public, lest the unthinking and uninitiated are betrayed into accepting something electrical which cannot fail to bring disillusionment and disappointment in its train. It should be the business of the gas industry to educate present and prospective consumers on the relative merits of gas and electricity for domestic purposes rather than allow judgment to go by default.

The use of gas has fully justified its existence; and domestic gas apparatus has long passed the experimental stage. The ubiquitous gas-cooker and the indispensable gas-fire have proved their worth in thousands of dwellings throughout the length and breadth of the country; and water-heating by gas only needs to be tried in order to be appreciated.

INTERNAL REQUIREMENTS.

Any housing scheme, therefore, which does not include provision for gas lighting, cooking, warming, and water-heating, either for immediate use or for ultimate requirements, cannot be regarded as satisfactory from the gas industry's point of view. Far better will it be to consider each housing scheme not only from the immediate, but also from the ultimate, standpoint, and treat it accordingly, rather than simply to deal with its minimum requirements. In this respect we can perhaps turn to good account the experiences of the past. When the slot installation system was first adopted, it was regarded as a bold venture. But it was subsequently proved to be a sound commercial proposition; and to-day it is firmly established in the general scheme of things. This raises the question as to whether or not the benefits arising from this system cannot be still further extended; or, alternatively, whether or not some inducement could not be offered in a housing scheme to prospective consumers with a view to the more extended use of gas.

In the former slot installations, some gas undertakings provided (say) two lights and a boiling-ring, griller, or cooker, as the case may be, and piped the houses accordingly. Then, in the event of any other apparatus, such as gas-fires or a water-heater, being required, either the lighting arrangements are necessarily and hopelessly upset, or a general duplication of pipes is unavoidable. In a hiring proposition, this means not only additional expense as far as the piping is concerned, but also a much greater expense on account of labour than would otherwise be the case if ultimate, as well as immediate, requirements were taken into consideration. It is a simple matter in a new house to make adequate provision for additional apparatus which will almost certainly be required in the near future; but it is an entirely different matter to make this provision when floors and carpets are laid, walls plastered, decorations completed, furniture arranged, and the occupier comfortably settled. In the former case, what might be "lost on the swings" would doubtless be "made up on the round-abouts."

The present shortage of domestic labour has resulted in a wholesale conversion of many householders to the use of such labour-saving contrivances as gas-cookers, gas-fires, gas-heated water appliances, &c.; and if only architects could be induced to realize the futility of planning coal-ranges that are not required, coal-grates that will be hidden by gas-fires, and coal-fired washing-coppers that are likely to be discarded in favour of gas-heated wash-boilers, a great and very beneficial advance would be made. Nothing surely is more uneconomical than to go to the initial expense of providing, and solemnly fixing, things that are falling into desuetude, especially when the cleaner, more convenient, and more labour-saving gas apparatus is preferred. There has been much discussion of the smoke problem, fuel economy, and kindred subjects. Here, then, is an excellent opportunity of accomplishing the object in view. A little practical co-operation on the part of architects, builders, and gas undertakings would do more to solve these problems than can be readily imagined.

It is a great mistake to suppose that fuel economy, a cleaner atmosphere, and other similar desirable features must of necessity be produced on a grand scale, or not at all. One has only to recollect the conditions that prevailed (say) a couple of decades ago, and compare them with the conditions that obtain to-day, in order to appreciate the progress that has been made in this direction already. But the pace needs accelerating; and by planning for the use of every conceivable kind of gas apparatus in the dwellings of the future, we make sensible improvement in the life and environment of the people.

PROBLEMS CONNECTED WITH AVOIDANCE OF OVERCROWDING.

In order to avoid the recognized evils of overcrowding, houses will undoubtedly be built fewer to the acre, and in the suburbs, rather than in our already congested towns and cities. Advantage will doubtless be taken of the Housing and Town Planning Act of 1909; so that slums, overcrowding, and all the deplorable circumstances connected therewith, shall not again be reproduced. Roads will be wider; open spaces, playgrounds, and gardens will doubtless be provided; and the residential district of the future will, in all probability, be generally much more spacious. All these considerations have an important bearing on the supply and distribution of gas, since the mileage of mains to accommodate a given number of houses will be greater than it has been hitherto. It may happen that more houses will be built outside the present area of supply than within it; but the deciding factor will probably be the quantity and suitability of the land available. In many cases, the adjacent mains will be much too small to cope with the prospective demand; and each housing scheme will present its own peculiar features. Many districts to-day are suffering from an inadequate supply of gas, under existing conditions, owing to the lack of a little intelligent anticipation. When the daily increasing demand for gas for cooking, heating, and lighting is taken into consideration, it will be readily understood that provision for an ample supply in future is essential.

ADVANTAGES OF HIGH-PRESSURE SUPPLY.

The planning of housing schemes on the outskirts of many towns and cities will undoubtedly involve the laying of high-pressure mains, since this would offer the best solution to the problem of supplying the required amount of gas to the consumers. A high-pressure scheme in this connection has many attractions. The greater mileage of mains for a given number of consumers has already been referred to; and it should be borne in mind that the length of services will conceivably be greater than under the existing conditions. By adopting a high-pressure scheme, the sizes of the mains and services will, of course, be considerably reduced, and corresponding economies will be effected. One great advantage of high-pressure distribution for low-pressure consumption is the maintenance of constant and adequate pressure at the inlet of every consumer's meter, irrespective of varying draft. This pre-supposes that the high-pressure gas will be governed-down at the consumers' meters, and registered and consumed as low-pressure gas. The further advantages of high-pressure distribution consist of the possibilities of high-pressure street lighting *en route*, and in the residential area, as well as being in a position to cater for high-pressure gas consumers who may require it for other purposes.

IN CONCLUSION.

Summarizing the foregoing, it will be seen that there are immense possibilities immediately ahead for the gas industry in connection with the housing of the people after the war. But it will be a serious mistake to postpone all consideration of these things until after the war. In these strenuous times, it might be argued that gas undertakings have little or no time to cope with anything save the pressing necessities of the hour. The demands now-a-days are truly very great and very exacting. Yet in justice to itself, and in its own interests, every undertaking likely to be affected would be well advised to face and study its own particular problem, in order that it may be ready with the best possible solution as and when required.

Recovery of Toluol.—The Pittsburgh Bye-Product Coke Company (an operating Company associated with the Koppers Company) have carried out a plan in conjunction with the Washington Gas Department to erect the first plant at the West station of the department for the removal of toluol from 5,000,000 c.ft. of carburetted water gas per day. It came into operation in July, 1916, and has since yielded 200,000 gallons of toluol. While the plant was the first to use this process, and many improvements increasing its efficiency and economy have been introduced, it proved a commercial and technical success, equalling the results promised by laboratory methods.

APPROXIMATE ESTIMATION OF TAR-FOG IN GAS.

By Alfred Edwards, of Leeds.

Brief notice only has been given in the "Journal" of the paper that Mr. Edwards read in December before the Yorkshire Section of the Society of Chemical Industry; but its subsequent publication in the "Journal" of the Society enables the abstract to be supplemented by the text of the paper and some notes from the discussion to which it gave rise.

The estimation of tar-fog in gas presents some difficulty. It is not easily and completely removed by filtration in bulk sufficient to weigh; while evaporation renders the true weight uncertain. Correct samples of the gas and tar-fog are not withdrawn from the gas stream as readily as one might expect. A critical examination of the problem indicates that only under specified conditions can the sampling be correct, owing to the non-homogeneous character of the flow and the momentum imparted to the fluid particles by velocity. These conditions require the sampling orifice to face the current at a point of mean velocity, and the flow through the orifice to be same in speed as the main flow.

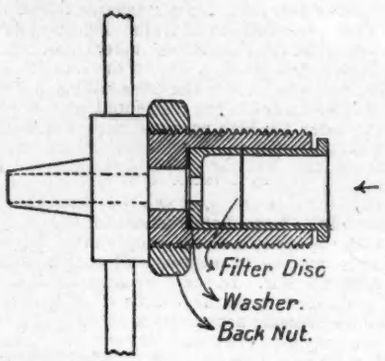
When I was requested to determine the efficiency of a tar-fog extractor, the conditions defined for accurate results seemed so impossible to reproduce that approximate methods were sought. A crude means of indicating the presence of tar-fog is to allow the gas issuing at high velocity to impinge upon a white surface. Attempts have been made to render a visual comparison of the resulting stains a basis for a roughly quantitative comparison between two similar streams. Visual methods of this character are decidedly preferable in technical work if they can be made quantitative as well as comparative. The variation finally adopted was to draw the gas through ordinary filter paper of stout substance and measure the increased density to light produced by the stain.

If we then know the area of the stain on the filter paper (A), the density of the stain (D), the weight of tar to give unit density on unit area (T), and the volume of the gas (V_g), the quantity of tar-fog present in the gas is $A \times D \times T \div V_g$, and may be expressed in grains per cubic foot or grams per cubic metre according to the particular units taken.

T is determined by suspending the tar, collected at the point considered, in solvent naphtha or similar colourless liquid, and measuring the density in a glass cell with parallel sides. If then W is the weight of tar taken, V the volume of solvent in which W is dispersed, V_c the volume of the cell, A the area of the side of the cell, and D the density of tar and liquid in the cell, the weight of tar to give unit density if spread over unit area is:

$$\frac{W \times V_c}{V \times A \times D} = T.$$

The instrument by which the density to light is measured is one intended for the measurement of silver deposits in photographic negatives. Its use in addition to this specific purpose I have extended to the determination of various substances, where in fact the estimation can be reduced to one of density to light, with such good effect that I have no hesitation in recommending it as an essential part of the equipment of any laboratory. It is sold under the name of the "Density Meter," and is a comparison



photometer of simple construction. Two apertures are viewed in such a way that they appear disposed side by side. A translucent object placed over one of the holes obstructs the light passing to one-half of the field of view; and its intensity can be balanced by means of a neutral tinted pigment wedge deposited on glass placed over the other hole. The wedge is graduated in terms suggested and used by Hurter and Driffield in their classical photographic researches, density = log. opacity, opacity being the ratio the incident light bears to the transmitted light. The density of neutral tinted bodies can be balanced exactly by means of the instrument.

When the body is coloured and transparent, the density to its complementary colour can be measured by viewing the aperture through a transparent screen of the correct colour. The coloured body is, in effect, converted into a neutral tint, and can easily be balanced against the neutral wedge. Where an opaque body is present in a transparent coloured fluid, the aperture is viewed through a screen of the same colour as the fluid; and the opaque body is balanced by the wedge. The instrument thus becomes a cheap, if crude, substitute for the spectro-photometer.

As an example of the determination of T (weight of tar per unit area to give unit density) the figures given in the following table were obtained. The density measurements were made in a glass cell of which the parallel sides were 10·2 mm. apart, the capacity 5·55 c.c., and the area of the side 5·441 sq. cm. An amount of 0·6674 grm. of tar was suspended in 50 c.c. of solvent naphtha, and portions were diluted to 50 c.c. before measurement.

Density to Light.

	2 c.c.	4 c.c.	6 c.c.	8 c.c.	10 c.c.
Red	0·37	0·77	1·13	1·51	1·87
Green	0·63	1·23	1·75	2·27	2·70
Blue	0·82	1·52	2·18	2·70	—
Density for 1 c.c. calculated from above.					
Red	0·185	0·192	0·188	0·189	0·187
Green	0·315	0·307	0·291	0·284	0·270
Blue	0·410	0·380	0·363	0·337	—

It will be observed that the density to red light is in this case fairly even throughout the range. With green and blue light there is a gradual falling away.

Taking the average density for 1 c.c. to red light we have the following facts: W = 0·01335 grm., V = 50 c.c., V_c = 5·55 c.c., a = 5·441 sq. cm., D = 0·188.

$$T = \frac{0{\cdot}01335 \times 5{\cdot}55}{50 \times 5{\cdot}441 \times 0{\cdot}188} = 0{\cdot}00145 \text{ grm. per sq. cm.}$$

The value of T varies for tars produced by carbonization in various systems, and with the temperature of carbonization in any one system. If the density does not increase in simple ratio with the weight, the points may be plotted, and intermediate values read from the graph.

Sampling the Gas.

The gas is filtered through a disc of filter paper cut out to a diameter of 1·8 c.m., and held between the ends of metal liners, 1·6 c.m. diameter, sliding within a screwed metal nipple—thus exposing 2 sq. c.m. of filtering area. The nipple is screwed ¾-inch gas-pipe, and enters a cock screwed hard-up to the gas-main. It is important that the connection should have a small volume, and that the filter paper should be as close as possible to the gas stream. A ¾-inch brass cock, full-way, with male and female ends, screwed directly into the main, provides the shortest and most convenient connection. In order to ensure a fairly representative sample of the gas the sampling must be rapid, in order to prevent the falling out of the larger tar particles. With this object, the difference of pressure between the two sides of the disc should be from 12 to 24 in. water column, depending on the resistance of the paper disc. Speed is also necessary to complete the removal of the finer particles of fog by impingement within the pores of the filter paper. One disc only is necessary, as a second one placed in series with the first and spaced by a metal liner is invariably unstained. The stain is always confined to the receiving surface of the first disc. Where the gas is under low pressure, an aspirator is used to give the required pressure difference.

The volume of gas to be passed through the filter paper to give a stain within measurable limits—say, 0·4 to 1·2—varies from 80 c.c. to 9000 c.c., depending upon the proportion of tar-fog present. With the smaller volume, the results become doubtful, since the volume of the voids in the connection and nipple bears an ever-increasing proportion to that of the gas sampled as the latter becomes smaller. If the filter paper is of uniform texture, and the connections short but of ample diameter, the stain obtained is evenly distributed. Slight inequalities are averaged-out by the density meter.

It is important that diffused light only should be used for measurement. Small pieces of ground glass covering the apertures, and below which the filter paper or cell is placed, secure this condition. Circles cut from the same sheet of paper have usually the same density, and balance one another if placed over the two apertures. Of a set prepared for estimation, one disc is retained as a blank, and divergent densities of others recorded and allowed for when the stain is measured, which should be with the blank in position over the wedge aperture. It is advisable to retain a second disc, which has been balanced against the blank, so as to check from time to time the setting of the density instrument.

It is not advisable greatly to exceed unit density of stain upon the filter paper. Although the measurement in a glass cell to a density of about 1·5 usually increases evenly with the weight of tar present, the uniform conditions of dispersion under which the soluble and insoluble portions of the tar are viewed, cannot be obtained upon the relatively small section of the filter-paper surface which is never absolutely uniform. Considering an extreme case, the tar particles—larger than those present in the cell—may fall one on the other and so extinguish the light in that one spot. Long before such a state is reached the density will fail to increase proportionately with the weight of tar. For comparative purposes it is desirable to secure approximately the same density in each determination, and check the weight of tar per unit area for that density—averaging the figures that are obtained over fairly narrow limits.

As an example of an estimation the following figures are given: A = 2 sq. c.m., D = 0·93, T = 0·00145 grm. per sq. cm., V_g = 3819 c.c.

Tar fog = 2 × 0·93 × 0·00145 ÷ 0·003819 = 0·70 grm. per cubic metre = 0·70 × 0·436 = 0·30 grain per cubic foot.

Interesting results have been obtained upon gas-streams passing through various manufacturing plants.

	Coal Gas.	Grains per Cubic Foot.	Grms. per Cubic Metre.
A.	Outlet condensers following seal in hydraulic mains	30	68
B.	Outlet condensers following part sealed and part dry mains with retort-house governors	15	34
C.	Outlet P. and A. tar extractors following A.	0·25	0·57
D.	Outlet rotary exhausters following dry mains and condensers	8	18·3
E.	Outlet rotary exhausters following B.	6	13·7
F.	Outlet turbo exhausters following B	0·6	1·37
G.	Outlet Livesey washers following D	0·6	1·37
H.	Outlet P. and A. tar extractors following E.	0·17	0·39
I.	Outlet P. and A. tar extractors following F.	0·14	0·32
J.	Outlet ammonia washers or scrubbers horizontal revolving type following G.	0·4	0·9
	Water Gas, Partly Carburetted.		
K.	Outlet rotary exhausters following relief holder	2·3	5·2
L.	Outlet Crossley tar extractor following K.	0·17	0·39

It will be observed that retort-house governors have an appreciable effect on the tar-fog; and the rotary exhausters remove a fair proportion of the remainder. Turbo-exhausters reduce the amount to as low a figure as Livesey washers following rotary exhausters. Pelouze and Audouin machines carry the removal to finer limits. The fact to observe is the relatively small difference in the outlet fog compared with a wide range at the inlet. Obviously, efficiency should not be based upon the percentage removed. At one works where the A+C combination is used there is trouble with the Pelouze and Audouin machines making-up. No trouble is experienced with the A+C or F combination. Overloading may account for the difficulty.

ACCURACY OF THE METHOD.

It was not expected primarily that the method would yield absolute figures for tar-fog with great accuracy. A short experience proves that if we take the densities of the stain per unit volume of gas, the figure is constant for any given gas-stream. Individual determinations reproduce the figure time after time if the variation of density is not too great. It has also been found that the quantity passing similar points in different works, calculated to an absolute amount from the stain readings, is in agreement, despite the fact that the densities of the individual tars to red light differ materially. Whether or not the method by which the density of the tar is ascertained is perfectly valid has not been settled by a direct weighing of the tar-fog extracted from the gas, in view of the many difficulties; but the agreement just quoted suggests that it is. Contrasting the filtration and actual weighing of the tar with the method proposed, the former must give low results because of evaporation of the constituents of lower boiling point. With the second, it is highly probable that evaporation will not affect the density to light, since the colouring matter with the free carbon remains behind.

DISCUSSION.

The CHAIRMAN (Prof. J. W. Cobb) said that he had himself attempted to face the difficulties with which the author had dealt so ingeniously. He endorsed all that had been said in the paper as to the difficulty of getting a really satisfactory determination of tar-fog by direct weighing. In order to obtain a sample, some form of conveying tube must be inserted in the gas-main; and that obviously would disturb the stream lines. Moreover, the impinging of tar particles on the sides of the tube resulted in their aggregation and elimination; for they were liquid and not gaseous. A similar difficulty was encountered with ammonia, which tended to elimination by solution. He asked Mr. Edwards if the temperature fell on the way to the filter-paper, because this seemed possible and would interfere with accuracy. The main difficulty in making the method more than approximate was that, although dispersion in the comparison cell made every particle capable of exercising its quenching effect on light, this was by no means the case with the filter-paper, where particles might lie one behind the other. The paper showed that the difficulty had been recognized; but a very much more considerable range of experiments seemed advisable for determining how far so convenient a method was also reliable. Had the results, showing that the effect of a turbo-exhauster was equivalent with regard to tar-fog to that of a rotary exhauster followed by a Livesey washer, been determined by a number of experiments?

Mr. B. A. BURRELL said the author had found that the various batches of filter paper were by no means uniform; and he asked whether this had any effect on the opacity, and therefore upon the estimation. Was it necessary to use a standard paper? Also had any attempt been made to use a Lovibond tintometer; and if so could the Lovibond units be converted into Hurter and Driffield units or *vice versâ*?

Mr. G. L. MOSS asked if the author had made any estimation of tar-fog before and after the benzol scrubbers, and also if the tabulated results from the extractors had been obtained under pressure or suction, or some under one and some the other?

Mr. JAMES MILLER asked if the author had tried the use of a soluble organic medium instead of a filter paper—a layer of naphthalene, for instance, to be afterwards dissolved. He thought this would overcome the difficulty suggested by the Chairman with regard to the filter paper.

Mr. GEORGE DOUGILL confirmed what had been said with regard to the turbo-exhauster. He could guarantee its efficiency as a tar extractor.

The CHAIRMAN: In your experience does it carry as far as the Livesey washer?

Mr. DOUGILL replied that this would be very difficult to say from works' observation; but the gas at the Livesey washer was very clean after a turbo-exhauster.

Mr. H. J. HODSMAN asked if the amount of tar fog found did not depend on the point in the cross section of the main from which the sample was drawn, and whether Mr. Edwards's experiments bore on the point. Had the effect of sampling at a bend been compared with sampling from a straight length of main?

Mr. A. WOODMANSEY inquired if it was feasible to base a method on direct observation through a column of gas in one of the mains. Some arrangement—*e.g.*, a current of fog-free gas—would be necessary for keeping the glasses clean.

Mr. EDWARDS, replying as to the temperature of the gas affecting the results, said that all his experiments had been made with cold gas—*i.e.*, with gas not differing by more than 20° or 30° Fahr. from the temperature of the surrounding air. If the metal instrument were allowed to remain in contact with the main long enough, there might be some effect; but if the sampling were carried out in a few seconds, he did not think that, from the state of vapour, there was any deposition of tar upon the filter paper. He had had determinations made on several days on which the temperature of the gas had not varied, while the temperature of the air had been 20° to 30° Fahr. lower. But on every occasion he had obtained the same results at the same point—serving to show that there had been no condensation from the state of vapour. Moreover, the nature of tar-fog rendered it improbable that there would be any such action. It was produced in the retort, and was really free carbon, containing small proportions of the oils; and if it did take up more of these, it could only be to a small extent. It was present right up to the Livesey washer—from 6 grains per cubic foot up to, say, 30 grains. He intended to make determinations with hot gas if he could find a gas that contained little enough fog. With reference to the superposition of tar particles on the filter paper not giving comparative results with tar suspended in liquid in a cell, this was, of course, the *crux* of the question; and he had not been able to satisfy himself on the point. Regarding the question as to turbo-exhauster results in comparison with rotary exhausters and Livesey washers, he said he had made perhaps two dozen estimations, and they had always come out within 0·1. In reply to Mr. Burrell, he said that different qualities of filter paper were difficult to get, and he had only used one variety. The tintometer was probably a fairly suitable appliance, but not so handy as the density meter. He had not made any determinations before and after the washing of the gas with oil for benzol. The results as regarded the Pelouze and Audouin extractor were under pressure. He had not been able to determine whether there was greater efficiency under vacuum. Efficiency was somewhat difficult to define, and one must not take the quantity of tar inside the machine and regard the percentage extracted as any test of efficiency. This was shown by the combination of "A" and "C" in the table of results, compared with "E" and "H." The turbo-exhauster was most efficient considering that it was really used for quite a different purpose. As to the position in the main from which it was best to take samples of gas, he had obtained his samples at the periphery. Very different results had been obtained at points facing the gas system and at right angles to it; and anything like the latter method must be avoided. Mr. Miller's suggestion, as to the use of naphthalene instead of a filter paper, was a very good one if it could be well worked out. It had also been suggested that, if tar-fog was present in sufficient quantity, its density to light could be observed directly by diverting a small stream of the gas from the main stream, but he was afraid this was impracticable.

Reactions of Acetylene.—In a paper, on "Some Reactions of Acetylene," read before the London Section of the Society of Chemical Industry, Prof. W. R. Hodgkinson described the effect, particularly on iron, cobalt, and nickel, of passing acetylene gas and acetylene gas diluted by ammonia over the metal. With so-called pure gas, the iron was not much affected; but there was a great physical effect on cobalt and nickel. They became brittle, and showed decided corrosion and pitting. With iron, there was more or less deep carburization; this effect being slight in the case of the other two metals. The carbon from the acetylene actually entered the ferro-metals. The type of carburization was peculiar; the carbon showing distinct diffusion into the metal. When the acetylene was diluted with ammonia, an almost smokeless flame was produced; and iron, cobalt, and nickel were more rapidly carburized than with the acetylene alone. Unfortunately, the physical properties were not altered on subsequent heating; the metals remaining brittle.

SCOTTISH JUNIOR GAS ASSOCIATION.

Joint Visit to the Alloa Gas-Works.

The annual joint visit of the Western and Eastern Districts of the Scottish Junior Gas Association took place last Saturday, to the Alloa Corporation Gas and Electricity Works. The members present numbered about fifty; and they were shown round the works by Mr. J. W. Napier (the Engineer and Manager) and Mr. Archd. Kellock (Gas Engineer at Airdrie, and a former assistant at Alloa).

Special interest was evinced in the vertical retort installation. The retorts, when erected, were capable of a nominal output of ¾ million c.ft. of gas per day; but, with improvements in working, and the very successful results from steaming, the capacity of the plant has been increased to almost 1¼ million c.ft. per day. The electricity generating station claimed attention, because of its installation of large gas-engines, and the fact that coke from the gas-works is the fuel used in the producer gas plant. It is hoped to find space in next week's "Journal" for some details regarding both works. After the inspection, an adjournment was made to the National Kitchen, where tea was served. The kitchen is situated within the works, and is under the supervision of the local Food Control Committee. The kitchen was equipped by the Gas Department, who charge the Food Committee a nominal rent for the use of the building and apparatus.

Bailie Henderson, the Convener, extended a hearty welcome to the members, and expressed the hope that the equipment of the gas-works and the financial and practical success of the working of the undertaking had impressed them all. The Town Council looked upon the gas-works—acquired almost forty years ago from a private Company—as an asset of great value, and with consistent good management for many years past the undertaking, with only a war rate advance of 4d. per 1000 c.ft., was in a thoroughly sound condition.

Mr. Scott (Largo) and Mr. Wright (Lockerbie) expressed the thanks of the members for the very cordial manner with which they had been received, as also for the valuable information they had gleaned.

Provost Pearson stated that the joint working of the Gas and Electricity Departments by the one Committee had proved in Alloa to be most satisfactory. There was this to commend it—that there had been eliminated any unnecessary rivalry, because, after all, at least so far as they were able to judge from their own experience, gas and electricity had each its own particular demand from the public who were being served. He emphasized, as one of the first lessons in successful management, the very great importance of keeping down the capital debt by liberal payments to the sinking fund account, and at the same time keeping the plant up to date and in good order. He thought that in Alloa they had succeeded in accomplishing this end.

Mr. Alex. Wilson (Glasgow) also spoke; and a reply was made by Mr. Napier.

Position of the Sulphuric Acid Industry.—A meeting of the sulphuric acid manufacturers of the United Kingdom is to be held on Friday afternoon, at the Cannon Street Hotel, to receive from the Sulphuric Acid Vigilance Committee a report as to negotiations with Government Departments and developments arising therefrom; to consider the recommendations of the Post-War Sulphuric Acid Committee's report [the contents of which were indicated in last week's issue of the "Journal"]; to determine, if approved, on the formation forthwith of a National Sulphuric Acid Association, as therein recommended; and, in the event of such an Association being determined upon, to appoint an Organizing Committee. The notice of meeting emphasizes the need for attending the conference, inasmuch as "there is general recognition of the fact that the present war-time juncture is fraught with serious consequences to the entire sulphuric acid industry."

Dr. Perkin and "Coalite."—Dr. F. Mollwo Perkin has written a letter to the "Chemical Trade Journal" much upon the lines of that which appeared over his name in the last issue of the "Journal." He says: For some unaccountable reason, there has been a confusion as to the products which are obtained by high-temperature processes and by low-temperature processes. Coalite is a low-temperature process; and the Coalite people are most insistent that the process *is* low temperature. Yet they claim to obtain products which can only be produced by high-temperature carbonization, as employed in the production of illuminating gas or in coke-oven practice. Why the Directors of Coalite should claim to produce products which cannot be obtained by low-temperature carbonization, is beyond my comprehension. Either their process is high temperature or low temperature. If low—which they claim—then their claims are incorrect. If high, then their contention that the process is low temperature is inaccurate. We require both low-temperature and high-temperature processes in this country; and the Government have been very slow to realize the fact. Low-temperature carbonization is required to produce petrol, fuel oils, and heavy oils; and high-temperature carbonization, to produce gas, coke for metallurgical purposes, and the products necessary for high explosives, dyes, &c.

ABSORPTION OF METHANE BY COAL.

Experiments described by Mr. S. H. Katz, in Technical Paper No. 147 of the United States Bureau of Mines, on the absorption of gases from various mixtures of Pittsburgh bituminous coal pulverized to pass a 200-mesh sieve, both in the fresh and the altered condition due to exposure at ordinary temperatures to air, established various points.

At ordinary temperatures, newly-mined Pittsburgh coal quickly absorbed methane from an atmosphere of air containing about 3 p.ct. of admixed methane; the absorption being 0·08 c. c. per gram of coal. After about four-hours' contact, an equilibrium existed between the methane and the coal, although changes in the coal may continue through absorption of oxygen with resulting oxidation of the coal. Under the same conditions, coal that had been exposed to the action of room air for five weeks, with resulting loss of methane, absorbed 0·16 c.c., or twice as much methane. After about four-hours' exposure, a condition of equilibrium existed between the coal and the methane. The coal in equilibrium with nitrogen absorbed methane in amounts that increased with the increase in the partial pressure of the methane. With absorption of the methane, there was an evolution of nitrogen in amounts somewhat less than the volume of methane absorbed. Nitrogen may be absorbed and evolved by coal. The amount varies with the temperature and the partial pressure of the gas. Coal in equilibrium with a mixture of nitrogen and methane absorbs gas with a fall in temperature, and evolves gas with a rise in temperature. If the temperature is held constant at a certain point, then allowed to vary, and again held constant at that point, a definite equilibrium between the coal and gas is repeatedly established. In so far as has been investigated, the absorption of gases by Pittsburgh coal is closely analogous to the absorption of gases by charcoal.

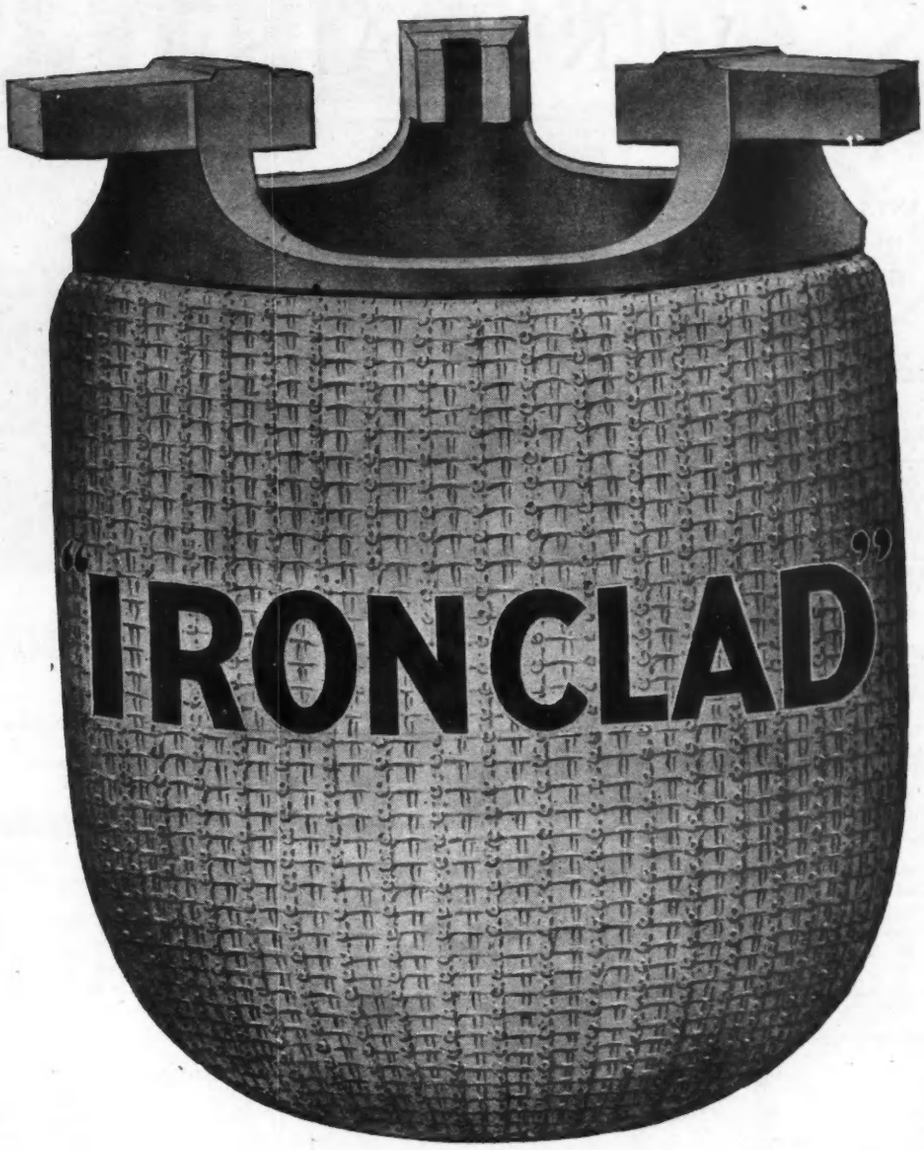
"Standard" Clauses for Street Lighting Specifications.

The Institution of Electrical Engineers have adopted the "Standard" Clauses for Street-Lighting Specifications which resulted from the appointment of a Committee in December, 1910, and with which the representatives and the Council of the Institution of Gas Engineers could not agree—their view being that contracts for street lighting should be based on the average candle power of light sources ascertained at two or three defined angles. This, it will be remembered, they submitted was the simplest and most correct method, and moreover would avoid the possibility of disputes arising from the more or less uncertain measurement of minimum horizontal foot-candle values. That the Institution of Electrical Engineers have adopted the clauses proposed by the majority of the Committee is seen by the fact that, on the face of a pamphlet containing them, appear the words "I.E.E. Standard Clauses for Street-Lighting Specifications." It is well to put the letters "I.E.E." before "Standard;" for it may be few people will accept them as "standard." The price of the pamphlet is 3d.; and for 4d. a copy can be obtained post free from the Institution of Electrical Engineers at their temporary offices, No. 1, Albemarle Street, London, W. 1.

British Industries Fair.

This year the annual British Industries Fair has made a move from Kensington to the London Dock, Pennington Street, E., where it will remain open until Friday of this week, for the benefit of buyers for home and oversea markets, in certain specified trades, which include glass. This is the fourth exhibition of the series; and it is pleasing to note that there are some 400 British manufacturing firms [none other are permitted to exhibit] taking part in it. The accommodation is ample; and the premises secured lend themselves much more readily to convenient arrangement of the stands than did those utilized for the purpose by the Board of Trade on the last occasion. Any Britisher who feels the desire [which is at intervals manifested] to belaud the industrial efforts of England's trade competitors and to belittle those of his own countrymen might profitably make a critical inspection of the goods on view in the Fair. With most of the sections "Journal" readers are not specially concerned; but it may be remarked that there is an excellent display of chemical glassware, porcelain, &c., for laboratory and scientific purposes. Indeed, "The Times" refers to this as "the most important feature of the Fair." Glass for lighting purposes also, of course, finds a place, though it is perhaps somewhat overshadowed by specimens of workmanship of a more generally attractive character. Apart from this section, a word of praise must be spared for the beauty and quality of the leather work which is to be seen there.

Mr. John Robert Pickering, of "Crestmead," Roundhay, who died last Thursday, in his 73rd year, was one of the oldest and best known engineers in Leeds. He was a member of the firm of Messrs. Clayton, Son, & Co., of Hunslet, and a Director of other undertakings. He had travelled abroad a good deal in connection with important contracts; and, generally, was an excellent example of the industry and enterprise which had put Leeds into the forefront as an engineering centre. Mr. Pickering leaves two sons and a married daughter.



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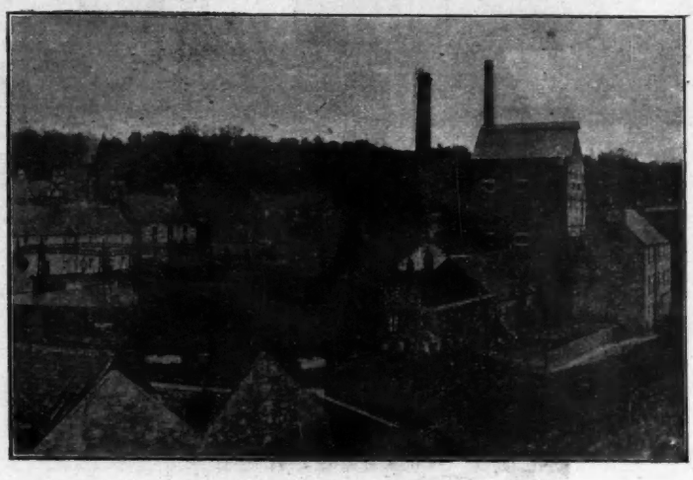

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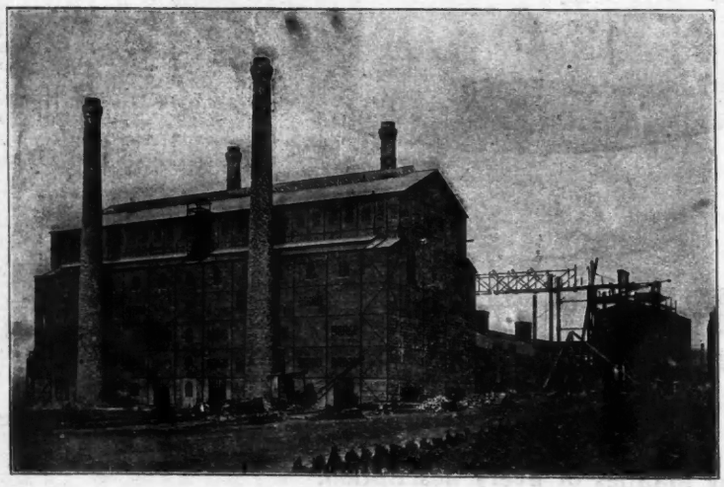

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"Coalite Réchauffé."

SIR,—The communication of Dr. F. Mollwo Perkin in your last issue concerning the articles which have appeared in the "Financier and Bullionist" were thoroughly to the point, and true. Dr. Perkin suggests that the Editor of the "Financier" was very badly coached, and wonders who the coach was.

One has, however, only to turn to the published literature disseminated by "Coalite" to find a sufficient number of pitfalls for the unwary to plump into; and in regard to the production of benzol and toluol, the Editor of the "Financier" has certainly dropped into a very deep hole!

It is rather difficult to follow the genealogical tree of the "Coalite" family, and its ramifications. We have the parent "Coalite" followed by 'British Coalite," the "Eticoal Syndicate," the "Barnsley Smokeless Fuel Company," and latterly by the "Low-Temperature Carbonizing Syndicate"—all offshoots of the parent tree. I have previously quoted extracts from the literature of the "Barnsley Smokeless Fuel Company;" but before the writer is an essay widely circulated by the "Eticoal Syndicate, Ltd.," Austin Friars House, E.C., and the perusal of this brochure is illuminating.

Of course, the usual preposterous claims regarding the production of benzol are made, but the really interesting portion is devoted to a description and diagrams of the so-called "Coalite" retort. The titbits are, however, in the preamble to the technical descriptions. It is well to quote verbatim:

> **The history of the Company formed to exploit the process "Coalite" is too well known to require any comment. In order that the lay reader may understand the reason for the initial failure and subsequent success of the process, we propose to indicate briefly the various methods of carbonization of coal, and the reasons for their adoption.**

Shortly therefore until the "Eticoal" scion of the "Coalite" family took a hand in the game, what had been done previously was a failure.

So far as the writer's information goes, it was "Eticoal" which made the great failure at Barking which in the brôchure they naively claim as a success!

But let us examine the retort. As the writer opined in a previous communication to the "JOURNAL," there were suspicions that a German patent had been drawn upon. If the retorts have been erected as depicted (in very considerable detail) on the "Eticoal" brôchure, then, in the writer's opinion, they are nothing more nor less than a reproduction of the Bueb intermittent vertical retort, as patented by the Stettin Chamotte Company. The writer is thoroughly conversant with the Stettin retorts, and cannot detect any difference, except perhaps in some details as regards heating, as the "Eticoal" retorts are coal-gas fired. They are ordinary fire-clay slot retorts similar in section to the Bueb, Woodall-Duckham, and Glover-West retorts; so where the "Coalite" patents lie is more of a mystery than ever.

But are these retorts suitable for low-temperature carbonization, and have they ever proved a success? The writer's opinion is—and it is an opinion based on knowledge—that this form of retort, material, and method of heating are quite unsuitable, and never will prove a success.

He makes the grave and well-considered statement that no existing form of fire-clay high-temperature retort, whether horizontal, vertical, or inclined, is suitable for low-temperature carbonization. Consider the fiasco in the manufacture of "Carbo" at the works of one of our largest gas companies.

If low-temperature carbonizing is to be carried out successfully, it can only be done by specially designed retorts; and yet with all the experience of "Coalite" to guide them, the Government is about to embark on the expensive, and the writer thinks useless, enterprise of putting new wine into old bottles, and using existing high-temperature retorts as low-temperature oil-producing retorts.

In the first place, cast iron is the only material serviceable for low-temperature work, especially when the retorts are to be worked under a high vacuum.

The Government will fail just as "Coalite" with its fire-clay slot retorts failed, and just as the production of "Carbo" failed with the horizontal low-temperature clay retorts.

"NEMO."

March 16, 1918.

Impurities in Coal.

SIR,—Respecting the complaints which appear in the "JOURNAL" from time to time regarding the abnormal quantity of dirt sent away from collieries in gas coal, I wish to say that the whole difficulties could be got over if the miners and their representatives would agree to the employment of women and girls to pick out the bats and pieces of rock and shale.

Women are employed for this purpose in Lancashire and Scotland, and abroad in pre-war days, where it was a recognized institution at collieries for females to do this work.

Speaking for my particular colliery, I may say that the difficulties this winter to carry on the pits, owing to shortness of screen hands, have been enormous.

Further, in consequence of the big advances in wages which have taken place, there is a considerable increase in the amount of absenteeism on the part of the few men left; and some mornings we have only had 50 p.ct. of the already depleted number to start the pits with.

It may be asked "Why is the dirt sent out of the pits at all along with the coal? The answer is that the colliers and fillers employed in getting and filling the coal underground have since the war began, in defiance of dirt deduction agreements, filled an increased quantity of dirt along with the coal.

If a man is dismissed, or fines are imposed, the risk is run of a stoppage of the pits.

There is, however, a certain amount of blame to be attached to the gas-works authorities, in that they have not, in the past, encouraged colliery owners to supply washed qualities, but instead unscreened coal to an increasing extent.

COLLIERY DIRECTOR.

March 14, 1918.

[The last paragraph of this letter is one which, in view of Mr. Thomas Glover's remarks at the recent meeting of the Southern Association, should be taken into account in awarding blame; but the complaint is as to the difference between the pre-war percentage of useless material and that delivered now. It is hoped that the appeal of the Coal Controller to the District Miners' Federations will produce a change in the conditions alluded to by our correspondent.—ED. G.J.]

The Reading Gas Company and the Aldershot Gas Bill.

SIR,—My attention has been called to the proceedings at the annual meeting of the above-named Company, as reported on p. 515 of your issue of the 12th inst., in which it is stated, as follows:

> "In the midst of all their difficulties, the Aldershot Lighting Company were promoting a Bill in Parliament with the object of obtaining powers to supply a district which the Reading Gas Company were already supplying, and other districts which were much nearer to Reading than to Aldershot. During his long experience, this was the first time any other company had tried to encroach on territory reasonably belonging to the Company. Consequently, in self-defence, they had been forced to petition Parliament against the Aldershot Bill."

This statement is scarcely reasonable, and not justified.

When the advertisements for this Company's Bill were issued, there was, inadvertently, included a parish belonging to the Reading Company, over which they have held statutory powers for nearly fifty years, and to which they have not yet supplied gas. This was brought to my notice; and I enclose copy of the correspondence which took place from Dec. 10, 1917, to Jan. 19, 1918. It was not until the Reading Gas Company lodged a petition that I knew they had supplied gas in part of the parish of Swallowfield, without statutory powers; and on Feb. 19 a letter was received from the Reading Gas Company's Parliamentary Agents, suggesting that this Company should exclude the part of Swallowfield west of the River Loddon, which the Reading Company were supplying. This has been agreed to.

I am sure you will appreciate how unjustified the statement of the Reading Company's Chairman is, and that the spirit is scarcely that which one anticipated from a neighbour, to whom every consideration has been given, from the moment the point was brought to notice.

R. W. EDWARDS.

Aldershot, March 13, 1918.

[ENCLOSURE.]

On Dec. 10, Mr. Edwards wrote to Mr. D. H. Helps, the Engineer and Manager of the Reading Gas Company—referring to a conversation they had had the previous week—asking the names of the districts within the Reading statutory gas area inadvertently included in the Aldershot notice for the Bill.

On Dec. 13, Mr. Helps replied that when his Directors learnt that the Aldershot Company were seeking powers to supply gas in Shinfield (detached), which is within the Reading statutory area, and in districts which immediately adjoin their area of supply and also much nearer to the Reading works than to Aldershot, they placed the matter before their Solicitors. Mr. Helps added: "I gather from what you tell me, that you were not aware that any of the districts included in your notice are within our statutory area."

Mr. Edwards wrote, on Dec. 14, intimating that he would be very happy to discuss with the Solicitors named any points, affecting the Reading Company, arising out of the Bill; and he repeated his request of Dec. 10 for certain information, as great care was taken to obviate touching the Reading Company's territory, as described in their Act of 1870.

Mr. Helps on Dec. 18 replied that Shinfield (detached) appeared to be the only portion of the Reading statutory gas area included in the Aldershot Bill.

Two days later, Mr. Edwards wrote: "Shinfield (detached) shall be dropped from our Bill. Of course, you will appreciate the inadvertence, as Shinfield (detached) appeared to be a separate parish from Shinfield proper—especially so as it is isolated by the parish of Beech Hill intervening. What are your views on this latter parish? Would you like us to omit this as well?"

Mr. Helps wrote, on Dec. 27: "I certainly think you ought to omit not only the parish of Beech Hill from your Bill, but also other districts, as my Company prefer and will, I know, consider your proposals from a broader point of view, and the omission of Shinfield (detached) and Beech Hill will not remove the objections which they feel, in principle, to the other proposals contained in the Bill."

On Jan. 12 Mr. Helps wrote: "I have to show on a 2-in. scale Ordnance Map your present parliamentary area of gas supply. This will involve a considerable amount of work, if I have to construct a map from your Acts of Parliament, and trace out the different parishes. It may be that you would be so good as to allow me to send a representative over to your office to take a copy of the map which, no doubt you have, showing your area of supply, or if you are willing to give me the information, perhaps you would prefer me to send you the maps, so that you could have your area marked upon them. I am sure that you will appreciate that I do not wish to escape any work by asking you to perform it for me; but if you will allow us to copy your map, it would save a very large amount of work in my office."

Acknowledging the receipt of the letter, Mr. Edwards (on Jan. 15) wrote: "A letter has also been received, through our Solicitors, from your Agents. It would, I think, save time and unnecessary expense, if some conference could be held. I have already given you the assurance that Shinfield (detached) and, if you desire, Beech Hill shall be omitted; and I cannot quite understand why your Company, or any

other company, can claim for parishes which have not heretofore been included in their limits of supply."

On Jan. 18 Mr. Helps wrote: "It would, as you say, probably save time and unnecessary expense if some conference could be held; but this is a question which had better be left to our respective Agents in London. If such a conference is held, it would be useful to have a map completed showing our respective present parliamentary areas of supply. You did not say in your letter whether (in order to save time) you would provide me with particulars of your area, or allow me to take them from your existing map. I am preparing such a map; but it would save a large amount of work if I could obtain the information from your Ordnance sheets."

Mr. Edwards closed the correspondence (so far as copies have been sent for publication) by writing, on Jan. 19: "My attitude throughout has been consistently neighbourly and reasonable. I have sought your Company's specific objections, and offered to meet them, so far as applies to the parish of Shinfield (detached), which, although in your Company's statutory limits, has never been supplied. Furthermore, I offered to delete Beech Hill—an intervening parish, not within your statutory limits. Therefore, until there is more candour between our respective Companies, I fail to see how we can get along. If, however (as I understand), you prefer future correspondence to come from your Agents, it would be as well to mark-time until I hear further."

The Wages Question.

Sir,—On this question, as referred to in your last issues, it seems to me that this (like similar ones in many other industries) is now likely—nay certain—to be settled in a general or national manner.

It is, therefore, very necessary that, whether the Committee of the National Gas Council or a wider representation of the industry (as I think should be the case) appear at the forthcoming conference with the Trades Unions to discuss and have an award given on the men's claims by the Committee on Production, they should go there with some definite understanding as to what is wanted.

There is not the slightest doubt that a concession will be granted; but whether the full claim or the famous 12½ p.ct., or an equivalent thereof, time alone will tell.

The adjudicated cases that have been reported show total awards of from 16s. up to as high as 30s. a week over pre-war rates. Now, while there may be something in local circumstances, these cannot be such as to warrant the extreme differences as above. The granting of 12½ p.ct. on present earnings is quite a mistake, as this is simply giving a bonus on previous bonuses and is thus continuing and augmenting the vicious circle.

Take, as an example, a pre-war rate of 5s. 4d. per shift, which was a fair average. The 12½ p.ct. on this is 8d. But suppose war bonuses and advances of 2s. 8d. per shift have been given, then the 5s. 4d. becomes 8s., and the 12½ p.ct. on this rises to 1s. In fact, the higher the bonuses already given, so much worse is the position of the undertakings which have given them.

A strenuous effort should be made, either to have any bonus given as a flat-rate based on pre-war rates, or else to have the 12½ p.ct. (or whatever the percentage may be) based on the immediately pre-war rates. If either of these ways was adopted, then everyone would know exactly what the award meant.

It will be seen from the foregoing that, while 12½ p.ct. on the pre-war rate is 8d., on the present rate it would be 1s., and not 12½ p.ct., but 18¾ p.ct.; and the general way of talking of advances or bonuses is as the total on pre-war payments, which is only fair.

I write in the hope that this may meet the eye of the parties who are to represent the industry, and that they may take note of it. I also hope that they will put it very strongly that, as this is to be a Government Department's award, the Government should in equity subsidize, or at least find a way for, gas undertakings to meet this extra wage payment (whatever it may be) in the same manner as is done for munition, iron and steel, and shipbuilding concerns.

This advance may amount to over 1 p.ct. on the capital of many concerns; and these have already been very hardly hit. E. L. L.

March 12, 1918.

Prof. Watkinson and Efficiencies.

Sir,—Thank you for kindly sending me a copy of the "Gas Journal" for the 12th inst., in which, on p. 488, you comment on some of the points discussed in the paper on "Our Fuel Resources, and Possible Improvements in their Utilization," which I read before the Liverpool Engineering Society on Feb. 20.

There is one point in connection with these comments to which I should like to refer—viz., that relating to the efficiency of the carbonization process of gas-works, which I give as about 55 p.ct. If the coke is withdrawn from the retorts in its hot condition, the total amount of heat required for the decomposition and distillation process, the amount escaping in the gas and vapours, and the amount lost in the hot coke, are the equivalent of about 5 p.ct. of the calorific value of the coal charged into the retorts. The amount of heat actually supplied to the retorts is slightly over 9 p.ct. of the calorific value of the coal, so that the efficiency of the process, which is equal to

$$\frac{\text{Heat theoretically required for the process}}{\text{Heat actually supplied in the process}},$$

is approximately equal to 55 p.ct. This, I believe, is the highest efficiency yet obtained under the conditions mentioned. In the proof copy of my paper, I did not define what I meant by the efficiency of the process, as I assumed that the definition which I have given above was well-known and generally accepted. When reading the paper, however, I defined the efficiency as explained above. In my view it is wrong, when dealing with the distillation process only, to define the efficiency as equal to

$$\frac{\text{The heat used in the process}}{\text{The total heat value of the coal charged into the retorts.}}$$

The latter method of stating the efficiency should only be used when the object is to gasify the whole of the fuel, as in the case of a gas-producer.

With regard to ventilation, the figures which you give on p. 489 prove my statement that the gas-fire is not as good a ventilator as the coal-fire. The results of the tests to which you refer, on the ventilating effect of gas and coal fires, show that gas-fires, on the average, cause the air in a room to be changed 5·2 times per hour, whereas with coal-fires the air of the room is changed 10 times per hour. So that, according to these figures, the coal-fire is twice as good a ventilator as the gas-fire. The ventilating effect of a gas-fire, according to the figures you quote, seems to be ample for practically all purposes, in spite of the fact that it is only one-half that of the coal-fire. I believe that, in designing systems of mechanical draught for ventilating purposes, it is usual to arrange for the air of a room to be changed only 4 times per hour; and on this basis the gas-fire is superior for ventilating purposes to that provided with the usual arrangements for ventilation by means of fans.

I regret that I have not time to deal with the other interesting points raised in your comments. W. H. Watkinson.

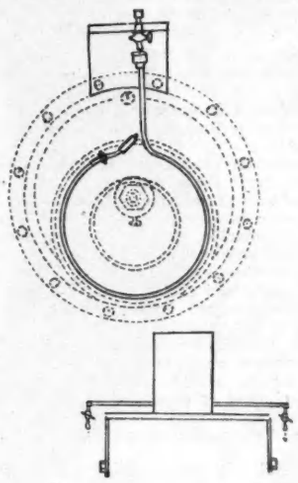
University of Liverpool, March 14, 1918.

[With the explanations given by Prof. Watkinson, there is no need for further comment.—Ed. G.J.]

Exhauster Lubrication.

Sir,—You noticed in the issue of the "Journal" for the 5th inst. a contrivance for lubricating exhausters by means of water instead of oil—emanating from France.

I enclose a rough sketch showing the method I have in use here. I think it must be quite ten years since I fitted this up for using water—"since when I have used no other." I take no credit for the method, as my father had used water thus for, I should say, ten or twenty years before I came to have the control of an exhauster.



You will see that I start away by removing the usual lubricator and inserting a **T**-piece, a short piece of wrought-iron tube, a union (to allow of removal for cleaning), a length of ¼-in. brass tube, on the end of which there is a reducing socket forming a 1-in. funnel. Above, on a simple bracket attached to the exhauster by the top two bolts, there is a drum for the feed, having arms and two tube-cocks.

My drip is not quite so quick as you state.

Whereas very special care seems to have been taken with regard to the quality of water used, I have only had very ordinary water. I have never found any trace of rust, though I do not "finish off" with oil—the exhauster wall always presenting a black coat of "wet paint."

Morpeth, March 8, 1918. R. Lockey.

Increased Consumption at Swindon.—The sale of gas by the Swindon United Gas Company for last year reached 180 million c.ft., or 19¾ millions more than during the preceding twelve months. It was stated by the Chairman (Mr. A. G. White) at the annual meeting that the profit, at £8931, was only £45 less than in the preceding year. The price of gas had been increased but slightly. A dividend on the ordinary stock was declared of 5¾ p.ct.

Leek War Wages and Gas Price.—The Leek Urban District Council have agreed to an award of 16s. per week over pre-war wages, or 2s. 8d. per day or shift, to all the employees in the gas department; and they have also decided that the price of gas to ordinary consumers be advanced 2d. per 1000 c.ft. It is stated that since the war began the total increase in the expenses of the gas-works has amounted to £7000 per annum; whereas they had only increased the price of gas to bring in half this amount.

Financial Burdens in Chicago.—The difficulties with which the gas industry of the United States is beset were exemplified at the annual meeting of the People's Gas Light and Coke Company of Chicago, when the Chairman (Mr. S. Insull) stated that, regardless of what action the Illinois Public Utilities Commission might take on the Company's request for an increase in rates, he did not expect any dividends would be paid during the year 1918. Although all dividends distributed in 1917 were paid out of surplus earnings prior to Jan. 1 of that year, the Company closed the year with a deficit of $365,201. The indications at present were that, if things remained as now, with no further increase in the cost of fuel, material, or labour, the Company would come through 1918 about $900,000 short of earning their bond interest.

REGISTER OF PATENTS.

Lighting Lamp-Posts.—No. 113,310.

SUNDERLAND, L., of Victoria Street, Westminster.

No. 2140; Feb. 13, 1917.

This invention consists essentially in the use of a light within the base of a street lamp-post, and in the provision of openings in the base for the emission of the rays of light "so as to illuminate foot-paths or roadways in any direction, without any general illumination."

The openings are fitted with glass or lenses and reflectors through which the light will be thrown in a horizontal or diverging direction, but concentrated nearer the ground, so as to "render unnecessary the hanging up of oil-lamps to the bases of existing lamp-posts or setting up flares in the streets and also during occasions when it is necessary to put out or dim high candle-power lamps at the top of the lamp-posts used for the general illumination, and, further, at certain late hours the high candle-power lamps at the top of the lamp-posts may be entirely turned off for purposes of economy, so that during the remainder of the night the smaller candle-power lamps installed in the lower parts of the lamp-posts may be utilized with corresponding saving of energy."

Methods of Bye-Passing Meters.—No. 113 370.

THORP, F., & H. T., of Whitefield, near Manchester.

No. 5862; April 26, 1917.

The patentees say: One of the present defects of meters constructed on the rotating turbine principle (which is, however, common also to all other types of meters) is that it is necessary to have separate valves, connections, and bye-passes, so that the gas can be passed through the meter or bye-passed according to desire. This entails (particularly in meters for measuring large volumes) costly apparatus, and occupies considerable space. Another difficulty experienced with the type of meter constructed according to patent No. 20,214 of 1901 (where the gas to be measured contains considerable quantities of foreign matter) is the accumulation of the matter in the guide-tubes directing the gas in parallel streams upon the turbine wheel.

Figs. 1 and 2 below show sectional elevations of the apparatus; fig. 3 an outside elevation; and fig. 4 a plan.

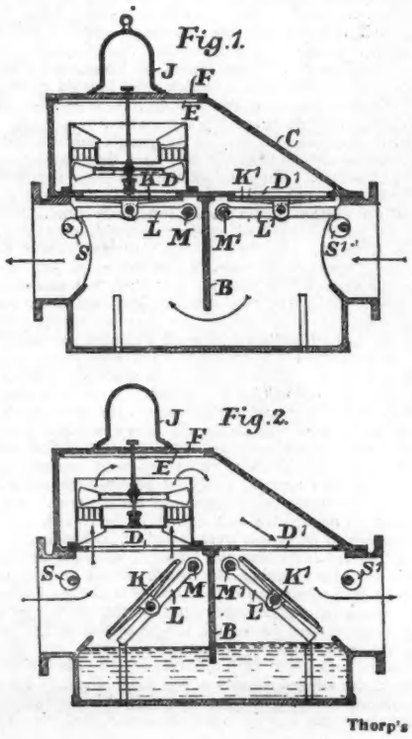
In fig. 1, the case is rectangular, with the inlet and outlet connections at opposite ends. A midfeather B divides the casing into two portions. It is stopped off at its lower end to such a distance that the necessary quantity of gas can pass with only a small absorption of pressure. To the top flange is fixed the casing C, which contains on its bottom flange two openings D D^1 and on its top flange an opening E, which is closed by a flange carrying the bonnet J. The openings D D^1 are closed by valves K K^1 carried by levers L L^1 mounted on shafts M M^1.

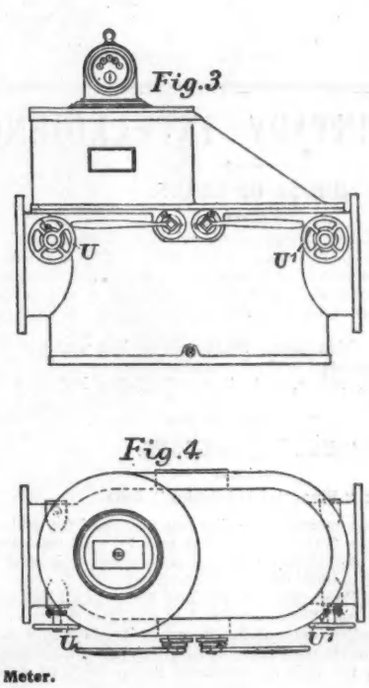
The valves are fixed to the levers by studs passing through the levers and projections on the valves, so as to enable each valve to set itself firmly on its seating. The joint is preferably made by fixing a yielding material (such as white metal) into a groove in the valve face and turning it up true.

In order to operate the valves, outside handles are fixed to the shafts; and on the shafts are also keyed ratchet wheels which engage into pawls, so that when the valves are raised into position they remain there, while the final tightening is done by eccentric cams S S^1 acting on the end of the levers L L^1. The cams, fixed to shafts, are operated by wheels U U^1; and on the shafts are fixed fine ratchets into which pawls engage to hold the cams in position.

To the top side of the opening D is fitted the measuring chamber of the meter, which is preferably constructed as shown in two different ways as figs. 1 and 2.

When using the meter, water is run into the main casing until the midfeather makes a seal and prevents gas passing under the midfeather. The valves K K^1 being open, the gas passes from the inlet through the opening D^1 down the guide tubes, past the fan wheel, through the opening D, and to the outlet. When it is desired to bye-pass the meter for cleaning or other purposes, the water is run out from the main casing, the valves K K^1 are closed, and gas will then pass directly from the inlet to the outlet under the midfeather.





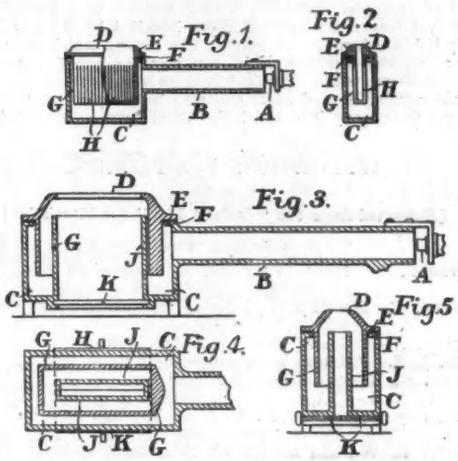
Thorp's Bye-Passing Meter.

Gas-Furnace Burners.—No. 113,355.

FLETCHER, RUSSELL, AND CO., LTD., FLETCHER, T. W., and BANKS, W., of Warrington.

No. 4413; March 27, 1917.

This invention relates to single-nozzle gas-furnace burners in which the mixing tube opens into an enlarged rectangular box-like mixing chamber provided with an orifice constituting the burner nozzle. The burning away of the nozzles of such burners necessitates the complete renewal of the burner; and the object of the invention is "to overcome this objection, and also provide for the ready cleaning of the burner nozzle."



Fletcher, Russell, & Co.'s Gas-Furnace Burner.

Fig. 1 is a longitudinal section and fig. 2 a transverse section of one form of the burner. Fig. 3 is a longitudinal section, fig. 4 a plan (partly in section), and fig. 5 a transverse section of a modified form.

In figs. 1 and 2 A is the gas-nipple of the burner; B, the mixing-

tube; and C, the enlarged rectangular box-like mixture chamber, fitted with a separate nozzle D fashioned with a rim E, which seats on a corresponding flange F on the wall of the chamber—a tight joint between the rim and flange being maintained by an asbestos washer and suitable cement. The nozzle is made with a body G which extends into the chamber C, and is preferably closed at its lower end. A number of slits or saw cuts H provide for the passage of the mixture to the nozzle, and also prevent "lighting back."

In figs. 3, 4, and 5, the mixture chamber C is provided with a passage J, and the body of the nozzle D (open at the bottom) surrounds the passage. With this arrangement anything falling through the orifice of the nozzle passes into the passage J instead of into the body of the nozzle or into the mixture chamber C. If desired, the opening at the inner end of the body of the nozzle may be only sufficient to allow the body to pass over the passage J, and slits may be provided in the body for the passage of the mixture.

Slidable plates K provide for the removal of dirt, &c., from the passage J and/or prevent the flow of air therethrough, or for regulating the flow of air to supplement the air drawn in by the mixing tube B in the known way.

Gas-Heated Radiator or Stove.—No. 113,396.

Watts, C. J., of Southampton.

No. 9400; June 29, 1917.

The chief objects of this invention are said to be to construct a radiator or stove in which the heat will be projected forward to a great extent, and in which the several parts can be quickly assembled.

The invention may be broadly described as consisting in carrying a reflector upwardly behind, and over the top of a row of burners sufficiently far to cause the heated air impelled by the gas flames to be projected in a forward direction. The canopy which comprises the deflector and the reflector, is in one piece of metal and supported by side members, which serve not only as a support for the metal of which the canopy is made, but will also hold a piece of tube extending across the canopy into which the small burners are fitted.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for March 13.]

Nos. 3733—4197.

Brownson, T. K.—"Production of ammonium nitrate." No. 3792.

Colbery, C. T.—"Spark-producers for gas-lighting, &c." No. 3852.

Docking, A.—"Gas-injector jets." No. 3886.

Ellor, J. E.—"Rotary gas-compressors." No. 3927.

Fowler, Sir H.—See Ellor. No. 3927.

Hannay, J. B.—"Apparatus for obtaining mixtures of constant composition by evaporation of volatile combustibles by air or gases." No. 3759.

Harvey, E. W., and the E. W. Harvey Gas-Furnace Company.—"Regenerative gas-furnaces." No. 3857.

Jones, G. J.—See Brownson.—No. 3792.

Kilburn, B. E. D.—"Cooling hot residues from distillation processes." No. 3997.

Macdonald, R. C.—"Control for gas-driven motors and vehicles." No. 4021.

Moore, J. S. & S. J.—"Gas-meters." No. 4043.

Morris, E. E.—"System of supplying explosive mixture to internal-combustion engines for vehicles by self-contained producer-gas plant." No. 3755.

Partington, J. R.—See Brownson. No. 3792.

Sharp & Preston.—See Docking. No. 3886.

South Metropolitan Gas Company.—See Macdonald. No. 4021.

Sulzer Frères Soc. Anon.—See Kilburn. No. 3997.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The British Gas Light Company (Norwich) Bill, the Brixham Gas Bill, and Chepstow Gas Bill were to be considered by a Select Committee to meet on the second sitting-day after the Easter Recess. The Committee will consist of the Earl of Ancaster (Chairman), Earl Lindsay, Lord Fairfax of Cameron, Lord Barrymore, and Lord Queenborough.

Subsequently, opposition to the Brixham Gas Bill was withdrawn; and the Bill was committed to the Unopposed Bills Committee.

The Aldershot Gas, Water, and District Lighting Bill was read a second time.

HOUSE OF COMMONS.

The "Financial Hardships" Bills.

After several postponements, Thursday last was fixed for the second reading of twenty-four Gas Bills, dealing mainly with the proposed modification of the sliding-scale; but consideration was then once again deferred—until to-morrow (Wednesday).

Mr. Whitley (the Chairman of Ways and Means) said he proposed to set the Bills down for Wednesday, at 8.15 p.m., in the expectation that on that day the President of the Board of Trade would be in a position to state to the House the method by which it was proposed to deal with so much of the Bills as concerned the question of statutory price. He did not anticipate that on that day any one of the Bills would be carried to a second reading; but he hoped that it would be possible to inform the House as to the method by which this part of the Bills was to be dealt with.

Mr. Rowlands asked whether this applied only to the part of the Bills with regard to the question of price, and not to other points of a very serious character in some of them, and of great importance to the localities.

Mr. Whitley: Those Bills which contain other proposals will have to be considered separately; and hon. members who take exception to them will have their opportunity later on.

Sir H. Harris: Is it intended that a discussion should take place on the second reading of the Bills, or on Wednesday?

Mr. Whitley: If the President of the Board of Trade is in a position to make a statement to the House, of course that can be followed by a discussion, if desired.

Mr. Clancy has given notice, on the second reading of the Alliance and Dublin Gas Bill, to move—"That it be read a second time upon this day six months."

Mr. Hudson has given notice, on the second reading of the Newcastle-upon-Tyne and Gateshead Gas Bill, to move—"That it be read a second time upon this day six months."

LEGAL INTELLIGENCE.

CLAIM ARISING OUT OF A GAS EXPLOSION.

Verdict for the Accrington Gas and Water Board.

At the Accrington County Court, on Thursday last, before his Honour Judge Sturges, K.C., Mrs. Margaret Whittaker, of Church, sued the Accrington and District Gas and Water Board, and Messrs. George Cunliffe and Sons, Ltd., builders and contractors, of Accrington, for personal injuries sustained on Aug. 16, 1917.

In her statement of claim, plaintiff alleged that she was walking along the footpath in Hyndburn Road, Accrington, and in the act of stepping across an electrical cable inspection chamber, when an explosion took place; the result being that she was lifted off her feet and thrown violently into the road, remembering nothing more until she found herself at home in bed.

Mr. J. W. Booth represented the plaintiff; Mr. A. H. Aitken, the Town Clerk of Accrington, appeared for the Gas and Water Board; and Mr. J. B. Sandbach for Messrs. Cunliffe and Sons, Ltd.

Mr. Booth said that as a result of the explosion the plaintiff was unable to follow her employment. Opposite the chamber where the explosion occurred an old mill was being demolished by Messrs. Cunliffe. On the day of the accident, some employees of the Gas and Water Board found a leakage of gas some 300 yards from Hyndburn Road; one of the workmen striking a match and causing the explosion. Upon examining the ground near the mill, it was found that a gas service-pipe was broken in two. This was due, he contended, to the throwing or pitching of stone, &c., on to the footpath by Messrs. Cunliffe, who were under contract with the Board to make good any damage they might cause.

Replying to the Judge, Mr. Booth said it was his contention that the escape of gas was due to damage done to the gas service-pipe in front of the mill. He also contended that the Contractors acted in a negligent manner in their method of pulling down the mill, in putting too much weight upon the roadway, and in not taking proper precautions to examine and disconnect the gas-pipes running to the mill. As to the Gas and Water Board, he contended that they were liable because of the manner in which they located the escape of gas, and also because, knowing the leakage, they did not take the necessary steps early enough to remedy the matter.

Mr. Sandbach, in reply to the Judge, said the defence so far as the Contractors were concerned was that they carried out the work in a careful manner. They cut-off the gas from the mill as soon as they commenced work; and when the smell of gas was noticed they reported the matter to the Board time after time. His submission was that the Contractors took every reasonable precaution.

Mr. Aitken, on behalf of the Gas and Water Board, stated that only one report was made to the Board of any escape of gas. An inspector visited the mill the next day, but could not smell any gas whatever. Evidently the smell of gas had been occasional and not continuous, for the simple reason that one of the witnesses stated that after the August holidays no smell was noticed until a week after work had been resumed. With regard to the escape of gas 300 yards away from the mill, complaint had been made of a smell of gas in some cellar premises; and one of the Board's servants visited the place and fixed a new meter and service-pipe. No smell remained on the premises to which he was sent. He afterwards put a light to the electric inspection chamber, and up went the top of the inspection chamber 300 yards away. There were no gas-mains connecting the two places; and the Board's servant could not possibly foresee what would be the result of his action at a point 300 yards away. He contended there had been no negligence on the part of the Board.

A number of witnesses were called on both sides.

Mr. *Charles Harrison*, the General Manager of the Gas and Water Board, said that during the whole of his connection with the gas-works he had never had experience of a similar explosion. When the service-pipes in question were put in the place was private property. As a matter of fact, he added, the pipes had been in since about 1850; while the meter was put in in 1852.

Evidence was given by employees of the Gas and Water Board with regard to the alleged reports of the smell of gas at the mill.

J. E. Coulson bore out the Town Clerk's statement as to how he lit a match 300 yards away, with the result that the explosion occurred,

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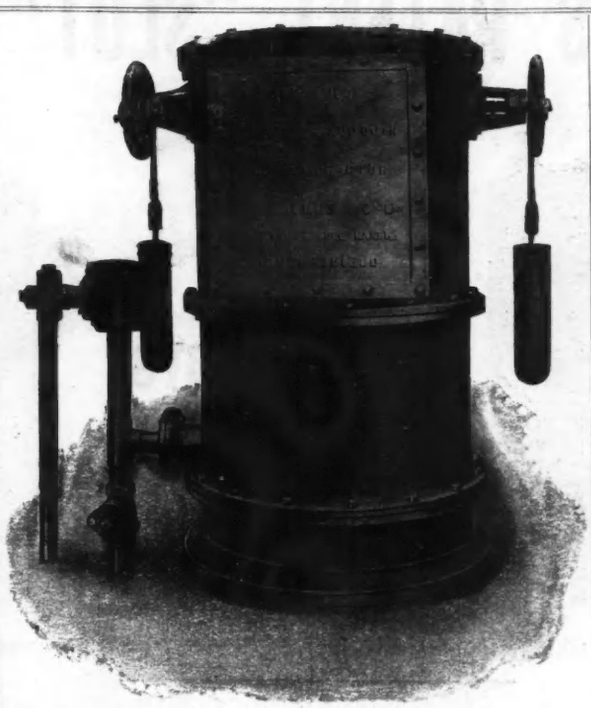

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No. 261. Dry "Slot" Meter.

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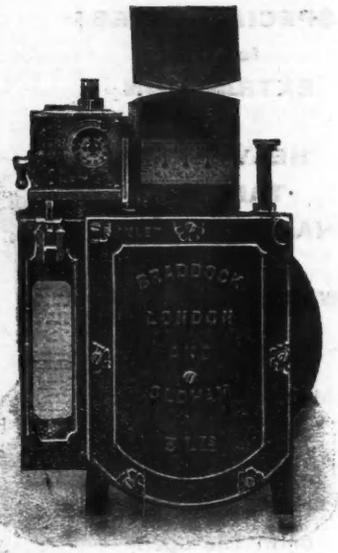

No. 265. Wet "Slot" Meter.

J. & J. BRADDOCK (BRANCH OF METERS LIMITED), Globe Meter Works, OLDHAM.

Telegrams—"BRADDOCK, OLDHAM." National Telephone No. 815.

AND 45 & 47 WESTMINSTER BRIDGE ROAD, LONDON, S.E. 1.

Telegrams—"METRIQUE, LAMB LONDON." Telephone No. 2412 HOP.

but said that had he known the electric cables ran up that way he would never have applied the light.

Henry Roberts, Mains Superintendent, said there was no direct connection between the gas-mains in Hyndburn Road and those 300 yards away.

Mr. *Arthur Cunliffe*, a Director of Messrs. Cunliffe, stated that in order to avoid damaging the flags, about 18 in. of accumulated rafter and plaster were tipped on the footpath; and even after this no big stones were thrown from the top, but were wheeled to the bottom. Witness detected the smell of gas the very first day he was there, and sent his foreman to complain at the gas offices. Two or three other complaints were made upon his instructions. He had no idea there were any gas-pipes underneath the flags.

Mr. *W. J. Newton*, the Borough Surveyor of Accrington, said he did not consider the work of demolition had been carried out in a proper way. Shoots should have been provided to rush the material down; and instead of it being allowed to fall on the footpath, it should have gone on to the setts.

Mr. SANDBACH remarked that the real question was not damages, but liability. He argued that the gas-pipes were not laid deep enough; and as this was the fault of the Gas and Water Board, the Contractors could not be held liable. It was a significant fact, however, that before the Contractors started throwing the stones down a smell of gas was detected, so that they could not be held responsible for this; and the pipe breakage must be due to some cause other than throwing stones on the flags. To sum up, the pipes were laid at an improper depth, and a servant of the Gas and Water Board acted improperly when he put a light to the leakage.

His HONOUR, in giving judgment, said abundant evidence had been given showing that the Contractors were negligent in the way they pulled down the old mill in Hyndburn Road, and so broke a gas-service pipe from which the gas escaped. The Board were not conscious that the escape of gas in Hyndburn Road had travelled along electric cables to a spot 300 yards away, where their servant applied a match to find a small leakage. He therefore gave judgment for £40 in favour of the plaintiff, and against the Contractors, Messrs. Cunliffe. He gave judgment for the Gas and Water Board.

Stoker's Claim for Compensation for Gas Poisoning.

Before his Honour Judge Lush-Wilson, at the Plymouth County Court, last Wednesday, George Luke, a stoker in the employ of the Plymouth and Stonehouse Gas Company, brought a claim under the Employers' Liability Act for compensation for illness caused by being "gassed" while at work. Mr. Isaac Foot (who appeared for the applicant) said that, when at work in front of the furnaces on Oct. 29, Luke inhaled some gas, which made him feel ill. He continued at work for some time, but becoming worse spoke to the night foreman, and afterwards became unconscious. He found himself on one of the big openings by the side of the retort-house, and fell to the ground from the staging, a distance of 15 ft. For several days he remained in bed; but on Jan. 1 he returned to work. Applicant declared that he still felt the effects of his injuries. In cross-examination, he said he had been in the employ of the Company for 26 years, and had inhaled gas on other occasions. Dr. Hart, who attended him, said that applicant suffered from serious injury to his ribs, and from gastritis; the latter condition being consistent with his statement that he had swallowed gas. Mr. E. R. Ward (for the Company) contended that Luke's condition was due entirely to natural causes, and called Dr. R. Simpson, who said the pain in the ribs was due to slight pleurisy, and he found nothing in the nature of gastritis. In his opinion, the swallowing of gas in the way the applicant described was not consistent with an attack of gastritis within twelve hours. Mr. P. S. Hoyte (the Engineer and Manager of the gas-works) said he did not think it would be possible to improve the condition of the works. In all the years he had been connected with them, he had never known a man overcome by the fumes from the retorts or furnaces. His Honour said he was not satisfied that the man's condition was due to an accident within the meaning of the Act. He therefore gave judgment for the Company.

The Heckmondwike Falsification Charge.

At the Dewsbury West Riding Court, on Monday of last week, A. J. Turner, of Huddersfield, until recently cashier to the Heckmondwike and Liversedge Gas Company, was charged with stealing £124 in cash, and with falsifying books. Mr. F. D. Richmond (Secretary of the Company) said the accused absented himself from business on Feb. 22; and on the following day the safe was opened by a blacksmith, and was found to contain only £133, instead of £258. A special box in the safe should have contained £3 odd, but was empty; and this sum had been debited in the petty cash account book as expended on Health Insurance stamps. The stamps had not been affixed to the workmen's cards, nor were they in Turner's desk. Asked for an explanation when interviewed by Mr. Richmond, the accused had replied: "I have taken the money; but I did not know it was so much." Turner pleaded guilty, and was committed for trial at the Quarter Sessions, bail being allowed.

Matlock Gas Company.—Mr. Tom Wright presided at the annual meeting of the Matlock Gas Company, and in moving the adoption of the balance-sheet explained that the revenue account showed a profit of £3089, and that during the past year the cost of materials had almost doubled. However, through good and capable management, they had overcome all difficulties, and the shareholders were to be congratulated on having under the circumstances so satisfactory a statement. During the past year the amount paid in wages had increased from £842 to £1118. It was decided to declare a dividend for the half year of 5s. 6d. per share, free of income-tax, and to carry forward a balance of £4508 to the current year's account.

MISCELLANEOUS NEWS.

SHEFFIELD GAS COMPANY.

The Ordinary General Meeting of the Company was held on Monday of last week—Col. H. K. STEPHENSON, D.S.O., J.P., the new Chairman of Directors, in the chair.

The CHAIRMAN, in proposing the adoption of the report and balance-sheet (some particulars from which were given in the "JOURNAL" for Feb. 19, p. 359), said that since the last annual meeting the Directors had passed through a time of considerable anxiety; but, notwithstanding all the difficulties they had had to face, they succeeded not only in maintaining as large an output of gas as in 1916, but the quantity sold in that year had been exceeded by no less an amount than 457,451,000 c.ft., which in itself might be regarded as a considerable achievement. Nevertheless, during December and January they were compelled at times, owing to shortage of labour, to reduce the pressure in order to avoid running out of gas altogether. This had undoubtedly caused dissatisfaction to some of their consumers, who had been using large quantities of gas in connection with their manufactures. To give some idea of what this meant, he mentioned that Messrs. Thomas Firth and Sons, Vickers', Hadfields, Sanderson Bros. and Newbould, Sir Joseph Jonas, Colver & Co., Edgar Allen & Co., and Cammell, Laird, & Co., used last year 979,552,000 c.ft. of gas, as compared with only 191,588,000 c.ft. in 1913—the year before the war. An Association had been formed under the name of the "Sheffield Gas Consumers' Association." This body had held two meetings, and had not only declared itself not antagonistic to the Gas Company, but had even expressed a desire to assist them. They wished that the Association had been in existence last autumn, and so could have influenced some of their largest consumers to lend them a few men each when they badly needed them. Their requests to about a dozen of the large firms to lend them men were in all cases refused, on the ground that they had not enough men themselves. A very few men from each of the large works in question would have made all the difference to the Company. The withdrawal of their labour would not have affected the output of the individual works to anything like the extent that a short supply of gas would have done. The Directors had laid their plans so as to make ample provision to more than meet the demands of their customers, and had arranged for additional plant which would have given a margin over and above the probable requirements of the past winter. Their calculations were, unfortunately, upset by the difficulty of obtaining suitable labour, and the non-delivery of the plant which was ordered in the early months of last year. Turning to the accounts, they had expended on coal £67,482, purifying £1260, stokers' wages £19,077, repairs of works £18,993, repairs of mains and services £2455, and law and parliamentary charges £1306 more than in 1916. On the other side, they had received £29,357 more for gas, £561 for meter and stove rents, £24,235 for coke, £2351 for tar; and there was a decrease in the receipts for sulphate of ammonia of £2721. These were the principal items; and the net result was that the profit had been insufficient to pay the dividend by £37,546. To meet this deficiency, and the increased cost of coal, due to the Coal Controller having advanced the price by 2s. 6d. per ton, and to the provision that will have to be made for the payment of the large increase in workmen's wages, and higher charges of all materials used by the Company, it had been found necessary to increase the price of gas as from April 1 next by 7d. per 1000 c.ft. Up to April 19 last, the workmen were in receipt of a war bonus of 7s. per man per week; but during the year successive additional grants have been made bringing the total war bonus up to 20s. per man per week. In addition to this they had had to concede the Government advance of 12½ p.ct. on the total wages paid—the men contending that they were entitled to it, as such quantities of gas were used in the manufacture of munitions. This advance made the price of gas to ordinary consumers 2s. 4d. per 1000 c.ft.—the same figure at which it stood 36 years ago. He called attention to the fact that in 1883 the profit required to pay the dividend amounted to 1s. 0½d. per 1000 c.ft., whereas at the present time the amount required to pay the dividend and interest on the debenture stock and loan from their bankers was only 3·82d. per 1000 c.ft. This was an indication of how economically the Company had been managed. It would therefore be seen that the increase in price was only put on to meet additional costs due to the war. There was no profiteering as regards gas, and the shareholders would receive nothing extra in the shape of dividends. This was in contrast to many local collieries and large firms, who were all paying increased dividends, besides making excess profits which were handed over to the Government. The bulk of the present-day shareholders purchased their stock at a price which yielded them only about 4 p.ct.; the benefit of 10 p.ct. all went to earlier generations. Out of 1458 holdings, 1305 hold less than £1000 of stock—in fact, 411 of them hold less than £100 of stock. The total number of meters in use on Dec. 31 was 109,716—an increase on the previous year of 544. The additional furnaces supplied by the Company were 141, consuming 88,890 c.ft. of gas per hour. This did not include furnaces fixed by outside firms. There were 856 gas-fires, 1850 boiling and grilling stoves, and 10,018 additional incandescent burners fixed. These figures would have been considerably higher had not the Company—with a view to meeting the demand for the works engaged in the output of munitions—decided, in September last, not to take on any new business, in order not to increase the consumption of gas during the winter months. Notwithstanding the strenuous, and as they ventured to think mistaken, opposition of the Corporation, the Company's Act, which permitted, among other things, the raising of £1,285,000 of additional capital, was passed. This money will be required to provide for extensions of works which will be necessary to meet the increased demand for gas in future years. In this connection, the Company have acquired in the neighbourhood of Wadsley Bridge 60 acres of land which they considered to be a very suitable site for the erection of new gas-works. Application was at the present time being made to the Board of Trade for a Provisional Order to enable the Company to use the land for the manufacture of gas and residuals.

The Committee of the House of Commons, in granting the Company power to use coke-oven gas, limited its application to heating purposes only. This was the outcome of the opposition. He did not, however, think the Corporation intended this restriction to be placed upon them; but when matters got into Counsel's hands, they were apt to become muddled. Power was being taken in the Provisional Order to supply this gas for lighting purposes also, provided the quality was maintained at the standard laid down by Parliament. The Chairman, in concluding his remarks, said it was only a few days over 100 years since a company was formed to supply gas to Sheffield, and during that period there had been only five Chairmen—Mr. James Montgomery, Mr. John Sykes, Mr. William Lockwood, Sir Frederick Mappin, and Mr. Wilson Mappin; the two-latter presiding over the destinies of the Company for a period of 45 years. Of the success of their administration Sheffield has had ample proof, and the decision of Mr. Wilson Mappin to relinquish the chairmanship and his seat on the Board was received with great regret by his colleagues, and he was sure this feeling would be endorsed by the shareholders. Mr. Mappin's business ability, unvarying and unflinching honesty of purpose, together with his many other sterling qualities which had always been so conspicuous in all his dealings, had contributed very much to the prosperity of the Company and to the benefit of their customers. He had the honour of claiming Mr. Mappin as one of his best and oldest friends; and he was able to speak of him as a patriotic citizen. During his (the Chairman's) two years' tenure of the office of Lord Mayor, as well as in other capacities which had brought him into touch with public needs, appeals to Mr. Mappin's almost boundless generosity were never turned empty away. Referring to the services of the Managing-Director (Mr. Hanbury Thomas) the Chairman said it was impossible to estimate what the Company owed to his zeal and business acumen, and to that personal interest which he had always taken in the success of the Company. The Company were exceedingly fortunate in having such tried friends as Mr. Thomas and the whole of the staff who gave such continuous and loyal service.

The report was adopted; and a resolution was passed declaring a 5 p.ct. dividend on the "A," "B," and "C" stock of the Company.

LEA BRIDGE DISTRICT GAS COMPANY.

The Half-Yearly Meeting of the Company was held on Tuesday last, at the Offices, Nos. 63 and 64, Chancery Lane, W.C.—Mr. A. M. Paddon, M.Inst.C.E. (the Chairman), presiding.

The Secretary (Mr. Richard Sandell) read the notice convening the meeting; and the report and accounts were taken as read.

A Very Large Increase in Business.

The Chairman, in moving the adoption of the report and accounts, said there was nothing in them which offered him any pretext for trespassing much upon the time of the proprietors. The first important point was the very large increase in the Company's business; and they must consider this as supervening upon an almost equally large increase in the period with which it was comparable. Further, he might tell them that the increase was still going on apace. The financial outcome was a very satisfactory conclusion to a successful half-year's working. The capital account showed that they had written off more than they had expended during the year under review; and the capital actually expended on the business of the Company now stood at the gratifying figure of £488 per million c.ft. of gas sold. Anything under £500 for a Company of this size must be an eminently satisfactory figure. On the credit side of the revenue account, they had obtained for gas, &c., £7417 more; while coke and breeze had brought in £1602 more—the total receipts being £8906 up. On the other hand, coal had cost £3864 more, which, taken in connection with the increased business of the Company, did not indicate any very great addition to the cost per ton. The apportionments made under the headings of repairs and maintenance were ample and sufficient, even in the peculiar circumstances that had to be dealt with to-day. The total expenditure was £8318 more; and the profit was greater by £588. For interest on debentures, income-tax, and the non-recurring item of stamp duty, there was required £3768; and the dividend recommended would take £6015. But the profit and a small amount due for interest gave them £9841; so that there was a surplus on the half year of £57.

The Suggested Limitation of Gas Output.

As to the future—and reverting to what he had already said about the extension of the Company's business—there were some grounds for apprehension as to what might lie before them. It became increasingly difficult to procure the necessary supplies for the distribution of gas; and if the increase in demand was going to continue at the present rate, their anxiety would become greater. But there had already been an intimation that the Government—and quite wisely—had determined to arbitrarily deal with this question of increased output; and it was almost certain that next winter they would have a limitation imposed upon them with regard to the output of gas. Their Company would not be at all indisposed to welcome such a restriction of the demands upon them; but it was an important matter as to how this restriction should be imposed. If the Government said, as he hoped they would: "You will receive so much less coal and other material for your purposes; and you must serve the public as best you can with this reduced amount," then he thought the wisest and the most practicable course would have been taken. But he did sincerely hope that the suggestion that anything should be done by imposing upon the consumer an enforced economy would not for a moment be considered. In the first place, he did not think it would be found practicable to enforce it; and, in the second place, it would upset the consumer, without securing any commensurate advantage in the direction desired. It would also make the relations between gas companies and their consumers far more difficult, at a time when it was obvious the best possible working relationship should be aimed at. There had been apparently an objection on the part of the Government to employ skilled, experienced, and technically competent men to carry out their various purposes; and there might be some object in putting an unbiassed and a disinterested person in control of matters appertaining to a certain industry. But he thought the loss was greater than the gain. It would surely be wiser of the Government to avail themselves of the machinery which existed, and had been tested by years of practice, and which depended for its success upon its own skill and competence. It would surely be wiser to use this machinery than to ignore it and try to deal with this matter over the heads of the gas undertakings in connection with the consumers. That this limitation must come seemed reasonable and inevitable. But were the Government going to reduce the use of gas for industrial purposes, for the production of munitions, and for vital necessities of life such as cooking and heating, and were they at the same time going to allow the amusements of the country to continue unrestrained and unaffected? He sincerely trusted they would consider this point, and that before the working-man went cold in his house the cinematograph shows would be closed, and before the production of munitions was reduced the theatres would be shut up too. He thought they were entitled to demand that the employment of gas and electricity for purposes which could obviously be dispensed with should be discontinued before the use of light and heat in its more important relationship to the needs of the people was interfered with. ["Hear, hear."] He ventured to hope, and he believed, that the control of coal would be more effectually and more intelligently dealt with in the future than it had been in the past. By the restriction of the sale of coke in the Metropolis, people had been driven to use coal; and so coal had had to be brought to London which otherwise would not have been needed. At the same time, London coke had been forced over the country—an additional burden upon a railway system already congested—to districts where coke was already available in ample quantities. He hoped they might find a change in these conditions; and it must necessarily be a beneficial one.

The Deputy-Chairman (Mr. G. W. Carey) seconded the motion, which was unanimously agreed to.

On the proposition of the Chairman, seconded by Mr. J. M. Miles, dividends were declared, less income-tax, at the rates per annum of 5 p.ct. on the preference stock and 6½ p.ct. on the ordinary stock.

Thereafter, the retiring Director (Mr. A. F. Phillips) was re-elected, on the motion of the Chairman, seconded by Mr. Carey; and the retiring Auditor (Mr. James Randall) was re-appointed on the proposition of Mr. Beuk, seconded by Mr. Gisburne.

The Chairman proposed a hearty vote of thanks to the officers and staff, who had done so well, in spite of all their difficulties.

Mr. A. W. Oke seconded the vote, which was unanimously accorded, and acknowledged by Mr. Sandell and Mr. F. W. Cross (the Engineer and General Manager).

The proceedings concluded with a similar vote to the Chairman and Directors.

RICHMOND GAS STOVE AND METER COMPANY, LTD.

Annual Meeting at Warrington.

The Twenty-Seventh Annual Ordinary General Meeting of the shareholders of the Richmond Gas Stove and Meter Company, Ltd., was held at the offices of the Company, Academy Street, Warrington, on Tuesday of last week.

The Chairman (Mr. Coxon) said the shareholders had the balance-sheet presented to them; and he thought they must be well contented with it. It was gratifying to him to tell them what the firm had in a small way been able to do to help the Government, because they had done more war work during the last twelve months than in any year since the war started. They had placed £28,000 of their money into War Savings, £27,000 of which had gone from the town of Warrington as the Company was a Warrington firm. The staff had served them well—they had given of their best; and the Directors had voted a sum of from between £1500 and £2000 to be distributed among them. The workmen had received increased wages; and he felt sure it would be the wish of the shareholders that the members of the staff who had served so well should also be recognized.

The Managing-Director's Remarks.

Mr. H. M. Thornton (the Vice-Chairman and Managing-Director), in seconding the adoption of the report and accounts, said: The balance-sheet and report now before you (our 27th) shows, I am sure you will agree, that the Company has attained a very strong financial position.

War Conditions.

As the war has continued, we find the character of our business, or rather its types of productions, have changed. Before the war we were known, primarily, to the gas undertakings of the country; and to them we supplied principally our domestic gas appliances. We are still in complete touch with these business friends of many years' standing; and when conditions permit them to return to their usual active supplying of stoves to their customers, our pre-war relations will, I am confident, be resumed to the fullest extent. But, since the war, we have become known to a second and extremely important and influential section of manufacturing interests—viz., the engineering industry. In many of the vast establishments so closely associated with the war, where the multifarious weapons of modern warfare are forged, there "Richmond" furnaces are playing their part in the many intricate and highly complex heat-treatments required in every stage of engineering work. This, I think, is a great asset to the Company. I feel quite satisfied that the good-will we are now creating, and the connection we are establishing with many of the greatest engineering firms in this country, will be of inestimable value in the years to come.

The Furnace Department.

Our furnace department has developed both in output and in the diversity of types produced for every conceivable heat-treating requirement. This department was well established when the war broke out, and the demand for furnaces became very heavy. To-day the output

has grown enormously; and we shall need to rely upon its further development more and more if the war continues. I regard this work as of the highest national importance—particularly during the present time; and when peace returns, and re-organization throughout the country takes place, we shall find many new requirements for our specialities in this direction.

INDUSTRIAL CANTEEN WORK AND NATIONAL KITCHENS.

Turning for a moment to one other department prominent in wartime—that supplying large cooking and water-heating appliances—I am glad to again speak of the continued demand we have experienced for industrial canteen work. We have been privileged to equip the dining rooms of many of our world-famous firms. If I may mention names for once, I could include Messrs. Vickers, Crossley Motors, Armstrong's, Dunlop's, Austin Motor, Cammell-Laird, and many other equally notable, besides almost every Government Department—Admiralty, War Office, Ministry of Munitions, Air Board, &c. A new movement is now in course of development on a large scale, which will entail a severe demand on our output of large cooking apparatus. I refer to the establishment of "National Kitchens." As you will know, the special department of the Ministry of Food has been created (with Alderman C. F. Spencer at its head) to give the necessary direction and assistance to local efforts. It was early recognized that the output of the required apparatus would demand the united efforts of all makers, not only of gas but also steam, &c. A Committee has been formed numbering some eighty manufacturers, of which I have been elected Chairman. Alderman Spencer has impressed us with the importance with which the work of his department is regarded by Lord Rhondda and the Cabinet; and he has been assured of the wholehearted efforts of the manufacturers in providing him with the necessary equipment in the shortest possible time.

OTHER ACTIVITIES.

From this brief review of our activities, apart from other important war-work we are engaged upon for aeroplane and shell production, it will be seen that we have good business in prospect. Many difficulties will no doubt arise, and probably increase, in regard to supplies of material and other matters; but, with the aid of the loyal staff by whom we are surrounded, I believe we shall be able to present to you a satisfactory year's working on the occasion of our next meeting, twelve months hence.

THANKS TO THE STAFF.

Dr. J. F. ATKINS moved that the thanks of the shareholders be tendered to the Managing-Directors, Secretary, and staff, for their efficient services during the past year.

Mr. J. W. SLACK, replying on behalf of the staff, said they appreciated most heartily the very kind consideration of the Directors in placing a sum of money at their disposal. So far as the works were concerned, there were difficulties to be encountered; and, as the Chairman had said, they were of daily occurrence. There were labour troubles, troubles in regard to material, and a thousand and one other things which did not give the Managing-Directors much rest. However, he (Mr. Slack) could assure the proprietors that the best of feeling existed among them all. They had their little defferences at times; but the best of feeling existed between the workmen and the staff. They straightened one another out at their interviews; they hit from the shoulder, and did not say pleasant things one side or the other. But they agreed to differ; and if they could not come to terms they let things simmer until a better condition of feeling prevailed. He was fairly well satisfied that the changes made during the past year—the change in the length of hours of labour—had tended to the benefit of the Company. With less hours they got a better output, and the result was shown in the balance-sheet presented.

DEVELOPMENTS IN THE GAS INDUSTRY.

Lecturing before the Engineering and Scientific Association of Ireland, in the Royal College of Surgeons, Dublin, Mr. H. T. Cotton, Distribution Engineer of the Alliance and Dublin Consumers' Gas Company, dealt with recent developments in the gas industry.

Like some other industries, he said, gas had only been valued at its true worth since the war had shown the world the important part it played in the life of the nation. They had seen to what a very large extent the products had been utilized in the manufacture of munitions. In its proportional contribution, he held, Dublin had taken its position at the top of the list. The latest important development was the use of gas for traction; but the ultimate object should be to substitute gas for solid and liquid fuel.

The gas of the future would, he believed, be a low-grade product of from 200 to 300 B.Th.U., supplied at higher pressure, and costing about 6d. per 1000 c.ft. He acquired an idea about eighteen months ago of supplying a mixture of gas and air in certain proportions from the works at a pressure of some 10 in., and introducing the remainder of the air required at the point of combustion. This was brought to his mind by the Selas system, which had met with success in lighting and heating in large factories. In this system, the gas and air were mixed in a proportion of two parts of air to one of gas compressed to 10 in. of water; the remainder of the primary air being taken in at the burner. By doing this, they saved half their coal consumption, doubled the capacity of the manufacturing plant, and obtained a more suitable and just as efficient gas at a cost of 6d. to 1s. per 1000 c.ft.

The lecturer expressed the opinion that the time had come when gas and electrical engineers should combine their energies for the common good, and put their "cards of knowledge" on the table.

Owing to the increase in the price of gas-cookers, the Malvern Urban District Council have decided that, when the present stock is exhausted, cookers should be taken either on the hire-purchase system, or purchased outright.

GAS FOR MOTOR VEHICLES.

In the pages of the "Manchester Guardian" there has been reproduced a photograph of a motor-plough operated by gas in the Midlands. One filling of gas, at a cost of 6d., is estimated to plough half-an-acre.

Writing on the subject of the use of compressed gas for large motor vehicles, the "Daily Telegraph" says: The enforced substitution of gas for petrol, and the possible further limitations of the use of the latter fuel, call for a quickened decision in regard to containers for large vehicles. Already this change in fuel has been effected to an extent calculated as the equivalent of 3,000,000 gallons of petrol saved per year. The choice between the now familiar flexible holder and the more compact steel container carrying gas under pressure is mainly dependent at present upon the size of the vehicle and the difficulty of obtaining steel. It was soon obvious that the flexible holder would come into extended use for small cars as a wartime expedient. The extension of the application of gas to larger vehicles seems at once to demand the use of compressed gas. Recently an illustration has been provided in the conversion of a 36 H.P. Wolseley 3-ton military lorry. The gas, stored in cylinders of the type usual for compressed gases, is contained at a pressure of 120 atmospheres, or 1800 lbs. per sq. in. The complete battery comprises nine cylinders in three units. Each cylinder has a capacity of 150 c.ft.; the volume of gas thus carried being 1350 c.ft., which is equivalent to about 5¼ gallons of petrol and to a 56-mile drive. The division of the battery into units of three avoids the whole installation being affected through mishap to any one cylinder. The cylinders are conveniently stowed away transversely under the car, the weight being well distributed; and they are easily interchangeable and replaced. The necessary reduction of pressure of the gas is attained by passing through a reducing valve, which lowers the pressure to about 15 lbs. per sq. in. At this pressure, it passes into a small container, from which the motor draws the gas according to the requirements of the varying load. The use of gas under even this high pressure should present no insuperable difficulty. For many years similar pressures have been employed on gas-driven trams, and would, in all probability, have had more attention but for the advent of electric traction.

Steps are also being taken to substitute gas for petrol in motor buses. Here, again, it is obviously impossible, on account of the large capacity and the encroachment upon seating accommodation, to use the flexible container. Experiments are, therefore, being conducted by the Eastbourne Corporation with gas under both low and high compression; the former representing about 300 lbs. per sq. in., or 20 atmospheres, and the latter 1800 lbs. per sq. in., or 120 atmospheres. The form of container selected for the low pressure is that used by railways for carrying illuminating gas. Three or four, each of which will hold gas equivalent to 1½ gallons of petrol, will constitute a battery, the total capacity thus being the equivalent of about six gallons of petrol. In the disposition of these cylinders, the canopy over the driving seat is to be utilized; and this has been strengthened to carry safely the added weight, which approximates to 8 cwt. The bulk and dimensions of these containers are such that no obstruction is offered to the view of the passengers. Failing this position for the containers, the alternative high-pressure system is available, and will be tried, in which case smaller cylinders will be necessary; and these can be more easily disposed on the bus. Means must also be employed to step-down the pressure to about 20 lbs. before being passed to the engines. The results of these experiments will be awaited with interest, constituting as they do some of the earliest attempts in utilizing compressed gas for large vehicles; the more extended application of the method being deferred until larger quantities of steel are available for the construction of the cylinders.

Urging consideration of local transport needs first, the "Commercial Motor" remarks as follows: Increasing railway transport difficulties—especially in the handling of coal—coupled with the rising demand for gas to meet power requirements, is somewhat handicapping the more extensive conversion of vehicles to this fuel. Correspondents have drawn attention to the reluctance of gas companies in certain parts of the country to meet the new situation. We have familiarized ourselves with the general trend of affairs, and are satisfied that, except in specific districts where the claims for power gas are abnormal, and where vehicle demands are decisively resented, there is a general inclination to assist motor transport. Many gas companies are refraining from advertising gas supplies for vehicles, from the fear that the resultant demand will overtax the available supply. But for the most part, these companies are perfectly ready to satisfy the claims of tradesmen within their areas. In other words, realizing the heavy handicap under which tradesmen are labouring to-day, they are willing to assist them to their utmost to keep things going. This means that they are fostering the policy of local claims first, and outsiders later if there is sufficient fuel to go round. We therefore suggest that contemplative coal-gas users should first approach their local gas authorities to ascertain the precise situation in their territory, and then, upon receipt of favourable particulars, complete their conversion with all speed.

A prize of £1000 is offered by the Automobile Association to encourage the development of a practical, convenient, and inexpensive method of utilizing coal gas as a fuel for motor-car engines. In framing the conditions of the competition (which will close on Dec. 31 next), the idea has been kept in view of enabling motorists to carry in a small space, not exceeding 19 c.ft., sufficient gas to take the place of between 2 and 3 gallons of petrol, so as to permit a car to run approximately 50 miles on a single charge of gas. The weight of the container or containers must not exceed 140 lbs. The cost to the motorist must not exceed £20, or an annual hiring charge of £5; and the expense of establishing and working plant for charging the containers must not increase the cost to the motorist by more than 3d. for such an amount of gas as is equivalent to a gallon of petrol.

The opposition of the Surrey County Council to the Bill of the Aldershot Gas, Water, and District Lighting Company relates to the provisions giving power to erect and maintain in the streets or roads standpipes for supplying gas to motor vehicles. This, the Parliamentary Committee felt, might prove detrimental to the convenience and safety of the traffic. The matter also required consideration by

Parliament, as authorizing for the first time the sale of gas in bulk to persons, not necessarily resident within the Company's area of supply, for consumption outside that area. To meet the first point, they suggested the insertion of a provision that the consent should be obtained of the road authority to the erection of standards. The second point appeared to be of more immediate concern to the district; for this additional demand for gas—particularly on special occasions—might prejudice regular consumers.

ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY.

Directors' Report.

The Directors of the Company, in their report for the half year ended Dec. 31, state that the accounts show a profit on revenue account of £35,190; and after providing for interest on debenture stock and temporary loans, there remains the sum of £25,864, to which must be added £1406 brought from the last account, and a credit from income-tax account amounting to £4851—making a total of £32,121. They recommend the declaration of the maximum statutory dividend on the consolidated ordinary stock, at the rate of £4 7s. 6d. p.ct. per annum, less income-tax. This will absorb £33,947, and will involve the withdrawal of £1825 from the reserve fund. There will then remain to the credit of this fund £24,959.

Statements appended to the report show that the gas made in the half year was 803,474,000 c.ft., including 203,224,000 c.ft. of carburetted water gas. The total quantity sold was 672,128,000 c.ft.; and the total quantity accounted for, 688,804,000 c.ft. The coal carbonized during the half year amounted to 51,274 tons; and the oil used and sold was 216,250 gallons.

ORGANIZATION OF THE ENGINEERING INDUSTRY.

The subject of last Friday evening's "lecturette" to the members of the Junior Institution of Engineers was the "Organization of the British Engineering Industry;" the lecturer being Mr. H. R. Summers, who is Secretary of the British Engineers' Association.

He told his audience, in the course of his remarks, that the subject he was dealing with was rather a large one. At the present time the Government were telling everyone to organize; but he did not know whether they were quite clear as to what they meant. In engineering, there were many branches; and most of them were already well organized. The manufacturing engineer was the pivot upon which the whole of engineering turned. It was he who had the power to block improvements or to encourage development and research. Perhaps it was a man who was not even an engineer, but a financier, at the head of the firm; but, in any case, it was the manufacturing business that had to practically apply the improvements, and all that was done by the individual. As he had said, the different parts of engineering were already well organized; but at present there was no connecting or co-ordinating link.

In October, 1914, the Engineers' Club of Manchester started a series of discussions on the organization of the British engineering industry; and eventually they decided, instead of forming a separate association, to become fused with the British Engineers' Association. The Manchester movement was stimulating the Association to try and supply this connecting link to all the different parts of the engineering industry; and, instead of being solely an association of manufacturing engineers, they were just starting a new class, called the "C" Class, for individual engineers. The work they suggested an individual member could do in connection with the Association was, first of all, research work. The conclusion his Research Committee had arrived at was that there were at present no means for the effective collecting of information and making use of it. They wanted to act as a central body—to have the information resulting from research sent on to them. It could then be collated and distributed, so that effective use could be made of it. They proposed to form District Committees, and perhaps Engineers' Clubs, and to hold meetings. Then there was work to be done by individual engineers abroad. Every engineer abroad should act as a sort of missionary or scout for the home engineering industry. There were many channels of information there which were not made proper use of under existing conditions.

Another very big question was the status of engineers. It was seen now that engineers had to be divided into very many classes; and the Association wanted generally to improve the status, and therefore the emoluments, of the individual engineer. Engineering ought to be universally recognized as one of the learned professions. They wanted it to be realized—and this could only be secured through organization and publicity—that engineering was a fascinating profession, and one to be proud of belonging to. When once a youngster took up engineering, and clearly recognized the immensity of what could be done, and the problems that confronted him, there was no chance of his attempting to wrongly employ the power he had learned to use. In whatever branch of engineering a man might be engaged, he learned to use power, which was one of the most fascinating things one could think of.

Blackpool New Gas Prices.—In a local advertisement announcing their new gas prices, the Blackpool Corporation Gas-Works point out that 100 c.ft. of gas yields 50,000 heat units, and a unit of electricity only 3416 units—gas being thus far the cheaper. The charges for gas are now, per 100 c.ft., 4d. through slot meter, 3½d. through ordinary meter, 3d. for power, and 4d. (6d. at week-ends) for filling motor-car containers.

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MILITARY HONOURS FOR GAS-WORKERS.

Gallantry Recognized at Manchester.

An interesting ceremony took place on Friday last, at the Bradford Road Gas-Works of the Manchester Corporation, when the Lord Mayor of Manchester (Sir Alexander Porter), the Chairman (Alderman W. Kay, J.P.) and members of the Gas Committee, Mr. Fred. A. Price (the Superintendent of the Department), Mr. John Harrison (the Chairman of the Bradford Road Works Committee), Mr. J. R. Hill (the Manager), Mr. A. L. Holton (the Works Superintendent), and other officials assembled to do honour to Sergeant Thomas Moran, of the 5th Manchester Regiment, and Pioneer Charles Kelly, Royal Engineers (both old employees at the works), who have been awarded the Distinguished Conduct Medal and the Military Medal for gallantry and devotion to duty in the field.

Sergeant Moran was employed at the Bradford Road station in 1914, as a coal trimmer in the chemical department, until his enlistment in the King's Own Royal Lancaster Regiment on Sept. 11, 1914. He was discharged on Oct. 30, 1914, on medical grounds as not likely to become an efficient soldier! Moran subsequently joined the 20th Battalion Manchester Regiment; and after undergoing an operation was able to go out to France in January, 1916. On Oct. 4 last, during an attack at Passchendaele Ridge, Corporal Moran (as he then was) gained the D.C.M., and was promoted to Sergeant for his conspicuous service in the field. Since November last Moran has been serving in Italy. The "London Gazette" contained the following reference to Sergeant Moran's gallantry: "He became detached with a handful of men during an attack. As the advance proceeded, he collected other men, organized them into a party, and consolidated his position. He remained in command until relieved, showing a very keen grasp of the situation. The knowledge which he gained of the position was of the greatest value; and he showed initiative and courage which were a splendid example to his men."

Pioneer Kelly since 1902 was in continuous employment at the Bradford Road Gas-Works, until he joined the Royal Artillery on July 17, 1915, and was sent to France on Nov. 28, 1915. In June, 1917, he was transferred to the 319th Road Construction Company, Royal Engineers. The official story of his gallantry is told in a few words: "On this date (Nov. 7, 1917,) Kelly, along with Lance-Corporal Brown, brought in a Corporal of the Royal Field Artillery after he had been knocked over with shrapnel. They dressed the man's wounds and then carried him to the dressing station."

In order to prevent any interference with the routine of the works, the presentations were fixed to take place at the dinner-hour—about 400 to 500 men and women congregating in the men's mess-room.

Alderman KAY, who presided, said they were met on a very interesting occasion—to present medals for distinguished conduct in the field to two former employees of the Gas Department. He was glad to learn that both men would have something more than their military medals to take away with them; for he understood that the staff and workmen at Bradford Road had decided to mark their sense of the occasion by presenting to each man a gold watch.

The LORD MAYOR said both men richly deserved their awards; and he had great pleasure in pinning the decoration on Moran's breast.

The CHAIRMAN having called upon Colonel Hutchinson, R.E., T.D., to present the Military Medal to Pioneer Kelly,

The LORD MAYOR did so; and shook hands heartily with both the men.

The recipients briefly returned thanks, after which

Alderman KAY, on behalf of the members of the Gas Committee, presented to Mrs. Moran and Mrs. Kelly War Saving Certificates, each of £14. Following this, he called upon

Mr. A. L. HOLTON, who in a felicitous speech, asked Moran's acceptance of a gold watch as a token of the workmen's appreciation of his services in the field.

Mr. T. PRINCE, on behalf of the staff and workmen, handed a gold watch to Kelly.

A Salford Medallist.

The Salford Corporation Lighting Committee and a considerable number of its employees met at the Salford Town Hall last week-end to do honour to Sergeant William Tate, Royal Engineers, who was decorated by the Mayoress (Mrs. Huddart) with the D.C.M.

Sergeant Tate, who has been wounded on three occasions, was first engaged as an office-boy in the department, and had been twelve years with the Corporation when he joined the Forces. The "London Gazette" account as to how the honour was won is as follows: "July 19, 1916—Delville Wood, on the Somme. For conspicuous gallantry and devotion to duty during operations. Sergeant Tate remained at work on a strong point after the withdrawal of the infantry, in spite of heavy shell fire. He had been severely wounded, and was suffering from loss of blood at the time."

Mr. W. H. HAMBLETT, the Superintendent of the Lighting Department, having expressed the pleasure it afforded him to see so many of Sergeant Tate's old colleagues present,

Mr. J. HULTON, the Chairman of the Committee, on behalf of the staff and workmen, presented Tate with a gold watch. As Chairman of the Committee, he felt very proud of him; and their Superintendent was also proud of him.

Sergeant TATE briefly expressed his appreciation.

Mr. C. H. Wordingham, M.Inst.C.E., whose official title under the Admiralty has hitherto been Superintending Electrical Engineer, will in future be known as Director of Electrical Engineering. His department will no longer be attached to that of the Director of Naval Construction, but be entirely separate and self-contained.

Gas Cookers.

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CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *March* 18.

Shipments of pitch are being steadily made from London. The value for export remains firm; business having been reported at about 50s. per ton in bulk at makers' works. Solvent naphtha remains at about 4s. 3d. net per gallon in bulk *ex* makers' works, with scanty supplies available. The market is quiet as regards other products; and there is nothing special to say with regard to them.

The position of sulphate of ammonia remains unchanged.

Tar Products in the Provinces.

March 18.

The average values for gas-works products during the week were: Gas-works coal tar, 27s. 6d. to 31s. 6d. Pitch, East Coast 20s. to 25s. per ton; West Coast—Manchester 18s. 6d. to 19s. 6d., Liverpool 19s. 6d. to 20s. 6d., Clyde 19s. 6d. to 20s. 6d., nominal. Benzol 90 p.ct., North, 10½d. to 11½d.; 50-90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, North, 7¾d. to 8¼d. Solvent naphtha, naked, North, 3s. 10d. to 4s. Heavy naphtha, North, 2s. 3d. to 2s. 6d. Creosote, in bulk, North 4d. to 4¼d. Heavy oils, in bulk, North 4½d. to 5d. Carbolic acid, 60 p.ct. East and West Coasts, 3s. 4d. naked. Naphthalene salts, 90s., bags included. Anthracene, "A" quality, 4d. to 6d. per unit; "B" quality, 1½d. to 2d.

Strike in Prospect at Colne.—A strike of gas workers and other municipal employees at Colne seemed very probable at the week-end. A short time ago, the National Union of General Workers applied for an advance of 16s. a week over pre-war wages for all their members; and after meeting representatives of the Union on the matter, the General Purposes Committee adopted a resolution that the award of the Committee on Production of 16s. a week over pre-war wages to employees in certified undertakings be extended to the employees in the Gas Department, excluding the clerical staff, and that the existing bonus of 9s. paid to the employees in other departments be increased to 12s. a week over pre-war wages, including clerical staffs—such increase to date from the first pay day in January last. A "Journal" representative ascertained at the week-end that Mr. Watkins (the Organizing Secretary of the Union) had written stating they cannot accept the offer; and it was expected that notices would be tendered. About 120 men are concerned.

Maximum Price Application at Shipley.

Mr. R. C. Maxwell, on behalf of the Local Government Board, conducted an inquiry at Shipley last Wednesday, into the District Council's application for a Provisional Order allowing them to advance the maximum price for gas from 4s. 2d. to 6s. 3d. per 1000 c.ft., and to allow a variation of the basis of sinking fund payments in connection with the gas-works. The maximum of 4s. 2d. is at present being charged. There was strong opposition at the inquiry, including representatives of Baildon and Esholt, which are in the area of supply. Mr. I. Lindow (the Council's Clerk) said they were faced with a deficit of £12,000, half of which was loss on the current year's working. They had had to meet heavily increased expenditure since the outbreak of the war; and there had been a greatly decreased consumption of gas. The Council's charges prior to 1914 had varied between 2s. 11d. and 3s. 2d. per 1000 c.ft. The present conditions were due entirely to the war. They did not anticipate having to go right to the proposed new maximum, and intended to meet some portion of the deficit out of the district rate. Mr. Richard Watson, in opposition, said the proposals were astounding, especially in view of the much lower prices of gas charged by authorities in surrounding districts, who had had to face the same war-time conditions. The Inspector remarked that, in making comparisons with other districts, the figure at which the Shipley undertaking was acquired from a Company in 1901 must be borne in mind. It was a big sum (£250,000) for the undertaking in which nearly everything was worn out, and heavy sums had had to be spent in renewals nearly every year since. A number of consumers' representatives made a strong complaint of the poor quality of the gas; and on behalf of a manufacturing firm it was stated that if the price was further increased, power consumers would consider going over to electricity. Mr. F. F. Rhodes (a member of the Council) said the Council had made a bad speculation in buying the undertaking in 1901, and another in 1903 when they purchased the Saltaire supply rights. The Inspector intimated that the decision would be forwarded in due course.

In response to an application from the Mayor of Wandsworth on the visit of the "Tank" bank to that borough, the Welsbach Light Company, Ltd., invested a further £5000; making, with previous acquisitions of war securities, an aggregate of over £60,000.

There has been forwarded from Washington the text of a Proclamation, dated Jan. 3, relative to the control by licence of the importation, storage, manufacture, and distribution of ammonia, ammoniacal liquors, and ammonium sulphate, from whatever source produced. All persons, firms, corporations, and associations (except those specifically exempted by the Act of Aug. 10 last), engaged in the business of importing, manufacturing, storing, or distributing these chemicals, were required to secure a licence by Jan. 21 this year.

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ESSEX WORKS, ASTON, BIRMINGHAM.

More Striking at Doncaster.

For the second time within a few months, the Doncaster Corporation employees are on strike, having come out last Tuesday night. The town was quickly without gas. A certain amount of electricity production was maintained, as the men here were not all affected; and the tramways employees, content with the recent award by the Committee on Production, continued work, though, owing to lack of workshop hands, even these services were in danger of stoppage. Practically all other departments are at a standstill. The men on strike number 250, belonging to the National Amalgamated Union of Workers, who demand, on top of an existing increase of 12s. weekly, a further 8s. for men over eighteen, and 4s. for those under this age. The gas problem, of course, is the most immediately serious factor in the whole situation. The men's representatives have announced that they are prepared to settle the strike on condition that all workers covered by the National awards accept the terms and findings of these awards; the case of men and women not so covered to be referred to the Chief Industrial Commissioner. A number of public buildings lighted by electricity generated on the premises by the aid of gas-engines were, naturally, affected.

Alleged Gas-Works Nuisance at Ayr.—Proceedings are to be taken in the Ayr Court regarding an alleged nuisance at the works of the Ayr Gas Company; and the Fiscal has received instructions from the Town Council to at once serve the necessary legal summons. A certificate has been given to the Corporation by the Medical Officer of Health that the work, manufacture, trade, or business of gas making carried on by the Company is so conducted that the supply of gas to consumers is of such a nature as to be injurious or dangerous to health. There is also a representation from ten ratepayers in the town.

Gas-Workers' Wages at Coatbridge.—The Committee on Production, to whom the matter was referred, have issued their decision in the claim put forward by the Municipal Employees' Association on behalf of the gas stokers, coke trimmers, and boiler firemen in the employ of the Coatbridge Gas Company. The claim was for an increase of 12½ p.ct., on the ground that this had been granted to labourers and semi-skilled workers in the engineering and kindred trades. Representatives of the parties were heard in Glasgow, when it appeared the men worked seven shifts a week. Up to the present time they had received war advances amounting to 3s. 3d. and 3s. 9d. a shift. About one-third of the business done by the Company relates to the supply of gas for use in connection with the manufacture of munitions. The Committee's finding is that the men of 21 and over shall receive, as from the beginning of the first full pay after Jan. 1, a bonus of 12½ p.ct. on their earnings, which shall not alter or become part of their time rates. In the event of any general award on the question of the 12½ p.ct. to gas stokers and other gas workers being hereafter given, this award shall merge in, or be superseded by, such general award.

Ilford Gas Company.

The report adopted at the half-yearly meeting of the Company stated that the sales of gas for the six months showed an increase of 5·66 p.ct. as compared with the quantity sold during the corresponding period of 1916. After providing for the interest charges, the balance of the profit and loss account available for dividend was £20,523, out of which the Directors recommended a dividend for the half year at the rate of £6 12s. 6d. p.ct. per annum on the "A" and "C" stocks, and £5 2s. 6d. p.ct. per annum on the "B" stock, less income-tax. These payments would leave a balance of £14,498 to be carried forward. The Chairman explained that the further greatly increased cost of coals, oil, freight, labour, and every class of material employed in connection with gas making and distribution, had compelled the Board to increase the price of gas to 3s. 9d. per 1000 c.ft. from Christmas. The stockholders were aware of the Government increase in the price of coal which was made towards the end of last year. When the price of gas was considered in June, there was no indication of this increase; and therefore no provision was made to meet the extra cost. In June, the approximate freight on a barge of oil was somewhere about £45; but this figure increased with each delivery, until now the freight stood at about £230 for the same quantity. Wages had also been increased during the past half year. The extra freight on oil, with the wages increase, came along after the June price of gas was fixed; and they would therefore readily understand why it had been necessary for the Board to again raise the price of gas from Christmas. The item of co-partnership had disappeared from the balance-sheet. This, of course, had been brought about by the price of gas, which automatically made it inoperative. As against this, however, the war bonus showed a considerable advance—being £2841, against £1386. Feeling reference was made by the Chairman to the loss sustained by the death of Mr. Childs, the Chief Clerk, who recently obtained a commission, and was soon afterwards killed at the front. Replying to a vote of thanks, Mr. W. B. Farquhar (the Engineer and Manager) said the men they had now, taking them as a whole, had given very good service; and if they were treated reasonably, he thought they would continue to act in the same way.

Gas Supply at Leighton Buzzard.—Heavy tractors on the roads have, in the case of the Leighton Buzzard Gas Company, been responsible for an increase during the past year of the unaccounted-for gas to over 11 p.ct. On the other hand, the increase in the make of gas was 15 p.ct.; the carbonizing plant being used to its full capacity during the winter months. At the annual meeting, a dividend was declared at the rate of 5 p.ct. per annum, less income-tax, amounting to £1560, and leaving a balance of £1186 to be carried forward. The re-building of three beds of six retorts is contemplated. They will be replaced by three beds of eight larger retorts, which will give an increase of roughly 12 p.ct. in the output.

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The extensive use of "Richmond" Gas Furnaces for the operation of hardening expensive and high grades of steel, emphasizes the remarkable temperature control and satisfactory results of Gaseous Heating for this work.

The Director of a world-famous Steel Works in which 500,000,000 c. ft. of gas is consumed per annum says:—

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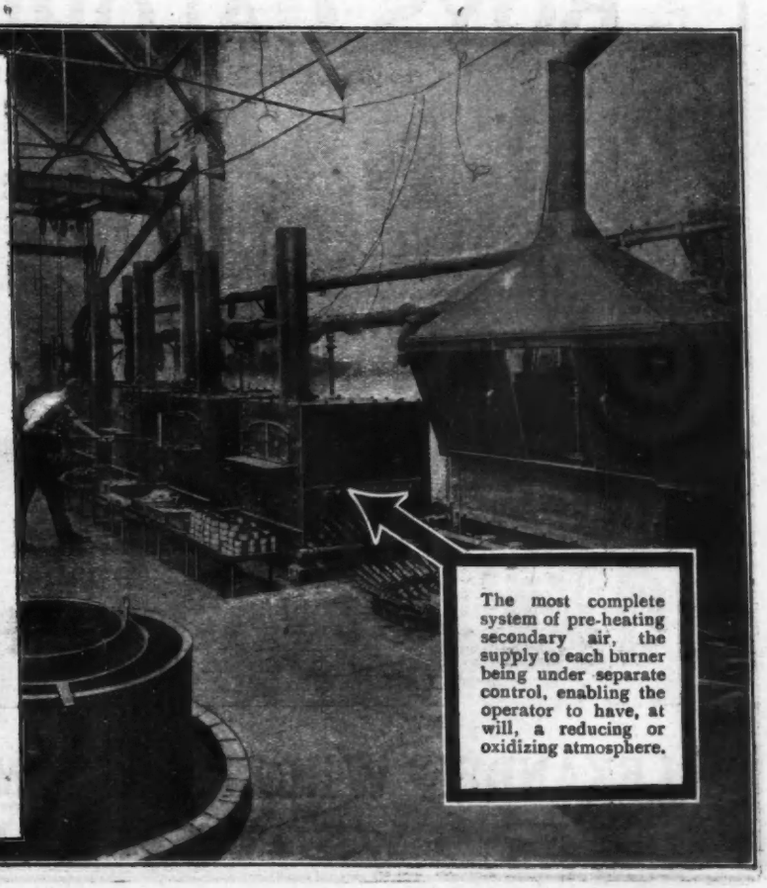

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Hastings and St. Leonards Gas Company.

The report which was adopted at the half-yearly meeting of the Company stated that the accounts showed a profit balance of £9407, which was sufficient to meet the standing charges and statutory dividends. The sale of gas was up to the normal; and there was a great demand for gas appliances. Owing to the many Government restrictions and other difficulties, it was, however, impossible to deal with more than a small proportion of the applications. The half year was one of continual anxiety and difficulty, with ever-increasing costs. Abnormal conditions of manufacture prevailed. Very little oil was available; and the coal obtainable was mostly of inferior quality. In September, the Coal Controller imposed an additional charge of 2s. 6d. per ton on all coal contracts; and further war assistance had been granted to employees. The full effect of both these items had yet to be felt. It had been necessary to increase the price of gas to 4s. 2d. per 1000 c.ft., which took effect from the Christmas readings of the meters. The Chairman (Dr. G. G. Gray, J.P.) said that the gas sold showed an increase of 23¼ million c.ft. as compared with the corresponding half year, or 11¾ p.ct. The net expenditure exhibited an increase of £11,394, or within £7 of the increased receipts. The report was adopted; and at a subsequent special meeting the proprietors approved of the promotion of the "financial hardships" Bill.

Suggested Earlier Theatre Hours.—Yesterday (Monday) afternoon, the Coal Controller (Mr. Guy Calthrop) was to receive a deputation representing the managements of theatrical, music hall, hotel, and restaurant enterprises, to discuss a proposal which is now being considered by the Board of Trade. With a view to saving coal and light, a scheme has, says the "Times," been prepared for the closing of all places of amusement, as well as hotels and restaurants, at 9.30, beginning probably next month. Under Summer Time, this would mean that 8.30 Greenwich time would be the latest at which these places of public resort would be kept open. It is believed that at first the proposals will be applied only to the southern part of England, including London and the Home Counties.

Bonus Question at Birmingham.—The wage, or rather the bonus, question, as applying to Corporation workmen engaged a good deal of attention at Birmingham last week. On Sunday, the men employed in the Gas and Water Departments, and a few of the depôt men on the tramway system, demanded that the 12½ p.ct. which had been awarded to them as from February by the Committee on Production should be made retrospective to October—the date upon which munition and electrical workers received a similar bonus. They decided to leave work at the end of the week unless the payment was made retrospective to last autumn. As a result of conferences on Friday, the men withdrew the strike notice, and agreed that the Lord Mayor should act as Arbitrator. He accordingly fixed the date from which the bonus should be paid as Dec. 15—a decision which gave great satisfaction to the workmen.

Directorate of the Horley District Gas Company.

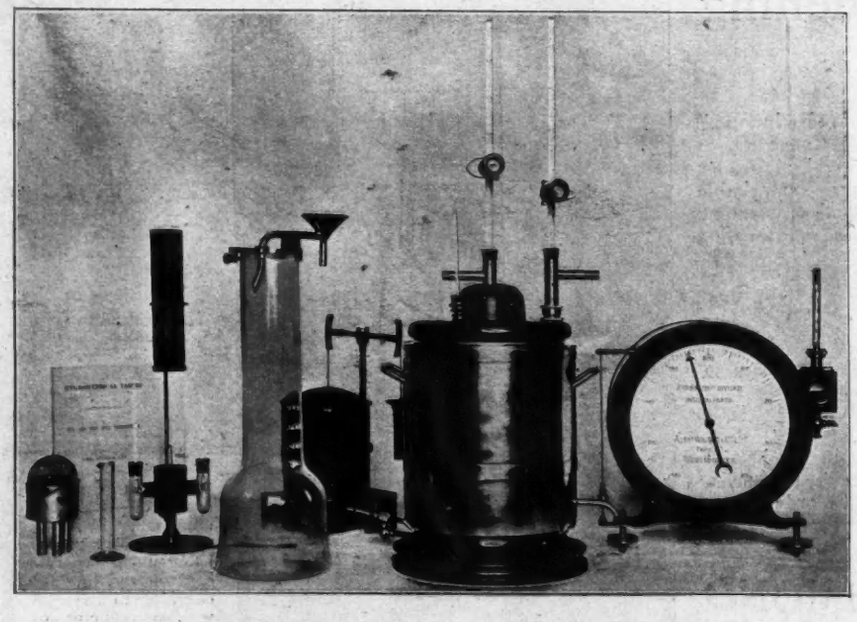
There has been a happy termination to the discussion (which was reported in the "JOURNAL" six months ago) regarding the constitution of the Board of the Horley District Gas Company. In the report which the Directors submitted at the recent half-yearly meeting, they stated that, in accordance with a resolution passed at the last half-yearly meeting—"that the number of Directors shall be increased from four to five"—the Board informed the shareholders that Mr. H. H. Mitchell, of Highgate, and Mr. Frederick James Hazeldine, of Southwark, had been duly nominated for the vacancy. Owing to an unfortunate omission of a name on the last half-yearly Directors' report, the Board, in their discretion, decided not to use the proxies forwarded to them for that meeting. Mr. J. W. Stevens had been elected Chairman of the Company in the place of Mr. J. Randall (resigned); and the Board took this opportunity of expressing their appreciation of the valuable services rendered by Mr. James Randall, who had consented to still retain his seat on the Board. [The name omitted from the previous report as a candidate for the seat at the Board was that of Mr. Mitchell, whose nomination was said to have been duly sent in, the Directors putting forward only the name of Mr. Hazeldine as their nominee.] At the meeting, Mr. Mitchell was elected a Director, and said he hoped to act in harmony with the other members of the Board. Mr. Livock, expressing gratification at this result, remarked that Mr. Mitchell had been rather indifferently treated; and he was glad to think the Directors had now "risen to the occasion." Dividends were declared at the rates per annum of 5 p.ct. on the preference stock, 5 p.ct. on the "A" capital stock, and 3½ p.ct. on the "B" capital stock (all less income-tax), leaving £528 to be carried forward.

Lewes Gas Company.—Dividends were declared at the half-yearly meeting of the Company at the rates per annum of 6 p.ct. upon the original capital stock, and £4 4s. p.ct. upon the additional capital stock, to meet which it has been necessary to draw upon the reserves to the extent of £167. An increase was announced of 15 p.ct. in the output of gas, as compared with the corresponding half of the previous year. Taking all things into account, the Chairman (Mr. M. S. Blaker) thought the position was satisfactory; and he had hopes that after the war they would return to their original dividend of 10 p.ct.

Oldham Gas-Workers' Wages.—In consequence of a misapprehension with regard to the action of the Oldham Town Council with reference to the application to participate in the 12½ p.ct. advance of wages, the gas-workers of the Oldham Corporation yesterday week tendered 48 hours' notice of their intention to cease work. The following day the men sent a deputation to the Engineer (Mr. T. Duxbury), who pointed out that it had been agreed by the National Union of General Workers that the matter should be referred to arbitration. Upon the position being explained, the notices were withdrawn; and at the week-end work was proceeding as usual. The action of the men was not authorized by the Union.

BOYS CALORIMETER.

Gas Referees Latest Pattern



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Watford Gas Company.—Regret was expressed by the Chairman (Mr. E. J. Slinn) at the half-yearly meeting of the Company that the Directors had been compelled to increase the price of gas 4d. per 1000 c.ft. as from Jan. 1; but increasing costs had left them no option in the matter. There was a balance available of £4309; and the payment of the full statutory dividends was agreed to. The report stated that an agreement had been entered into with the Rickmansworth Urban District Council to supply gas in bulk to Rickmansworth and district from Watford. Owing to the war, the Council had found it increasingly difficult to carry on their undertaking.

Vertical Retorts at Glasgow.—With reference to the vertical retorts at the Dalmarnock Gas-Works of the Glasgow Corporation, the Engineer and General Manager (Mr. Alex. Wilson) reported at the last meeting of the Gas Committee as to the advisability of immediately erecting a third section, in view of the greatly increased demand for gas. The Committee, after consideration, agreed to recommend that drawings be prepared, and offers obtained, for the erection of a third section; that ground available at the Provan Gas-Works be prepared, and arrangements made for erecting thereon a double section of vertical retorts and the necessary purification plant, &c.; and that application be made to the Ministry of Munitions for the requisite permits and certificates relative to the proposed works.

Retford Gas Charges.—The Gas Committee of the Retford Corporation have decided to advance the price of gas 6d. per 1000 c.ft., in consequence of the increased cost of coal.

Edinburgh Gas-Workers Again Agitating.—Not satisfied with the recent addition of 7s. per week to their war bonus (making it 17s.), the Edinburgh gas-workers, through the National Union of Corporation Workers, now demand a further bonus of 3s. per week, *plus* 12½ p.ct. on their total earnings. A man, therefore, who, before the war, was receiving 30s. a week would, if this demand were granted, get 56s. 3d.—an increase of 87½ p.ct. It is understood that the men have discarded the idea of arbitration, and that they hint that, if they cannot come to terms with their employers, they will rely upon themselves—in other words, come out on strike. As the above demands have been also addressed to the Corporations of Edinburgh and Leith, a conference took place at the Edinburgh City Chambers on Monday of last week, which was attended by representatives of the two Corporations and of the Gas Commissioners, who discussed the proposals in detail. It was decided to hold another conference, after the various bodies had had an opportunity of going into the question, and it was further agreed that a representative of the Government Department concerned be invited to the conference, in order that the attitude of the Government in the matter might be ascertained.

STOCK MARKET REPORT.

THE general aspect of affairs on the Stock Exchange continues unchanged, awaiting the advent of some motive power to galvanize it into life and action. Last week's course was devoid of interest—quiet as ever, jogging along slowly in a humdrum sort of way without one factor to make for either a bull or a bear point. But though for the greater part of the week the tendency was dull and drooping, yet towards the close the signs appeared slightly more favourable, and the last prices in some lines were a turn better than the general run of the week.

This was the case in the gilt-edged market, where Home Government issues were not meeting with support. But a turn came at last, and War Loans, Consols, and others effected a welcome, albeit quite moderate, recovery. Home Rails moved irregularly almost from day to day in response to fluctuating views—hopeful or otherwise—in regard to their future outlook with respect to Government control. On the whole, prices kept up fairly well. Canadian Rails were weak on a forecast of poor trading results for the year 1917, though the actual figures were not to hand before the close. The position they disclose demands suitable Government action. Argentines could report good traffics, but net results were unsatisfactory.

Business in the Gas Market, which in the week before was giving more signs of life, fell back again last week to its previous measure of inactivity. Not a dozen undertakings had any transactions in them at all, and the best of them could put together but a meagre aggregate. Movements were somewhat irregular; Gas Light and Coke being among the firmest. Apart from *ex div.* adjustments, which were numerous, other changes in quotation were adverse. South Metropolitan fell 5, Newcastle 2, and Commercial 4 p.ct., Continental Union ordinary and preference, and Imperial Continental 1 each.

In the Money Market, rates fluctuated, closing firm.

Bargains done for cash during the week were as follows: On Monday, British 32½, Commercial 3½ p.ct. 62½, ditto debenture 53, Gas Light ordinary 63½, 64, ditto preference 69¼, 69½, ditto debenture 56, Imperial Continental 87, Metropolitan of Melbourne bonds 94½, 100, Monte Video 8, South Metropolitan 69½, 69½, 69⅝, ditto debenture 55¼, South Suburban 73½, Tottenham debenture 62, Monte Video 5 p.ct. debenture 75, New Romney 3½, Wymondham 4. On Tuesday, British 32½, Commercial 4 p.ct. 69, 69½, Gas Light ordinary 63¾, 64, 64¼, ditto maximum 56, 56½, ditto debenture 55, Imperial Continental 87, Metropolitan of Melbourne bonds 101½, South Metropolitan debenture 55¼, 56, South Suburban 73¼, 73⅞, Tottenham "A" 91½, 92, ditto debenture 62½. On Wednesday, Cape Town preference 7⅛, Commercial 4 p.ct. 68½, Gas Light ordinary 63¼, 63⅜, 63⅝, ditto maximum 56, 56½, ditto debenture 56, 56½, Imperial Continental 87. On Thursday, Bournemouth 10 p.ct. 21½, 22, Gas Light ordinary 63¼, 63½, ditto maximum 55¼, ditto preference 70, ditto debenture 55½, 55⅝. On Friday, Cape Town preference 7¼, Gas Light ordinary 63¼, 63⅜, 63⅞, ditto debenture 56, Imperial Continental 86, 86½, 87, Primitiva 35s., 36s., ditto preference 65s., South Metropolitan 64, 64½, 65.

The Bank rate is 5 p.ct., as fixed on April 5.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Share.	When ex-Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
175,472	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	55—60	..
1,551,868	,,	April 8	2½	4¼%	Alliance & Dublin Ord.	59—64	52—57	..
874,000	,,	July 10	4	4%	Do. 4 p.c. Deb.	76—79	58—63	..
280,000	5	April 29	7½	3/6	Bombay, Ltd.	57—62	5—5½	..
50,000	10	Feb. 26	16	18%	Bournemouth Gas and Water { 10 p.c.	29—30	22—24	21½—22
388,110	10	,,	7	7%	B 7 p.c.	15—15½	10½—10⅝	..
115,000	10	,,	6	6/-	Pref. 6 p.c.	13½—14	9—9½	..
159,740	—	—	—	4%	4 p.c. Deb.	..	67—69	..
992,045	Stk.	Feb. 26	14	14%	Brentford A Consolid.	261—266	76—79	..
734,920	,,	,,	11	11%	Do. B New	204—209	73—76	..
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	79—84	..
231,400	,,	June 11	4	4%	Do. 4 p.c. Deb.	91—93	63—65	..
217,380	,,	Feb. 26	11	9%	Brighton & Hove Orig.	208—213	140—145*	..
244,300	,,	,,	8	6%	Do. A Ord. Stk.	154—159	95—100*	..
530,000	20	Mar. 26	12½	22/6	British	44—45	32—33	32½—32½
120,000	Stk.	June 28	4	4%	Do. 4 p.c. Deb. Stk.	88—90	66—68	..
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	51—54	..
100,000	10	—	—	—	CapeTown & Dis., Ltd.	1½—2½	3½—3⅞	..
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	7—8	7⅛—7⅞
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	58—63	..
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	79—81	..
1,513,380	,,	Feb. 12	5/9/4	41/4	Commercial 4 p.c. Stk.	106—108	67—69	68½—69½
560,000	,,	,,	5½	36/8	Do. 3½ p.c. do.	103—105	62—64	62½
475,000	,,	June 11	9	8%	Do. 3 p.c. Deb. Stk.	69½—71½	52—54	53
300,000	,,	,,	4	—	Continental Union Ltd.	76—79	38—40	..
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	60—62	..
278,400	—	—	—	11½%	Croydon B and C 7 p.c.	..	155—165	..
—	—	—	—	10%	Do. E	..	..	..
492,270	Stk.	—	6	6⅔%	Derby Con. Stk.	132—135	95—100	..
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	80—83	..
1,002,180	10	July 29	10	6/0	European, Ltd.	17½—18	8½—9½	..
16,298,975	Stk.	Feb. 10	4/17/4	37/4	Gas Light and Coke { 4 p.c. Ord.	98—102	63—65	63½—64½
2,600,000	,,	,,	3½	3½%	3½ p.c. max.	76—79	55—57	55½—56½
4,062,295	,,	,,	4	4%	4 p.c. Con. Pref.	96—99	69—71	69½—70
4,674,850	,,	June 11	3	2%	3 p.c. Con. Deb.	72½—74½	55—57	55—56½
190,000	,,	,,	10	10%	10 p.c. Bonds	..	..	..
258,740	,,	Mar. 12	5	3½%	Hastings & St. L. 3½ p.c.	87—89	46—51*	..
70,000	10	April 29	11	8%	Hongkong & China, Ltd.	16½—16⅝	7½—8½	..
66,600	—	—	—	9½%	Hornsey 7 p.c.	..	115—125	..
121,000	Stk.	Mar. 12	7½	7%	Ilford A and C.	151—154	90—95*	..
65,780	,,	,,	6¾	6¾%	Do. B	115—118	70—75*	..
65,500	,,	June 26	4	4%	Do. 4 p.c. Deb.	92—94	63—66	..
4,940,000	,,	May 14	9	4½%	Imperial Continental	150—160	86—88	86—
1,235,000	,,	Feb. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	65—67	..
285,242	,,	Mar. 12	6¾	6¾%	Lea Bridge Ord. 5 p.c.	119—121	82—87*	..
2,498,905	,,	Feb. 26	10	5%	Liverpool 5 p.c. Ord. { A / B	211—213 / 146—148	82—84	..
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	71—73	..
75,000	5	June 11	6	2/-	Malta & Mediterranean Mes. of Melbourne { 4½ p.c. Deb.	4½—4¾	3⅝—3¾	..
250,000	100	April 1	4½	4½%		99—101	89—100	94½—101½
541,920	20	May 28	4	6/-	Monte Video, Ltd.	11½—12	8—8½	8
1,875,892	Stk.	July 29	4½	3½3%	Newcastle&Gatsh'dCon.	96½—99½	73½—74½	..
529,705	,,	June 26	3½	3½%	Do. 3½ p.c. Deb.	83—88	60—63	..
55,940	10	Feb. 26	7/14/0	7%	North Middlesex 7 p.c.	14—15	9½—10½	..
300,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	103—105	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7⅞	2—3	..
60,000	50	Feb. 26	12	10%	Portsea, Island B	126—131	82—87	..
100,000	50	,,	12	9%	Do. C	118—121	72—77	..
52,000	50	,,	10	7%	Do. D	..	..	..
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	1⅞—2	35/-—36/-
499,960	5	June 26	5	2/6	Do. 5 p.c. Pref.	4½—5	2⅜—3	65/-
531,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—93	76—78	..
—	—	—	—	4%	Do. ,, 1911	..	..	..
846,198	Stk.	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	57—62	..
150,000	10	May 14	6	6/-	San Paulo { 6 p.c. Pref.	10½—11	7½—8	..
125,000	50	July 1	5	5%	5 p.c. Deb.	47—49	40—42	..
135,000	Stk.	Mar. 12	10	10%	Sheffield A	223—224	..	..
209,984	,,	,,	10	10%	Do. B	222—224	178—181	..
538,500	,,	,,	10	10%	Do. C	220—222	..	..
90,000	10	May 28	9	6/-	South African.	10½—11½	9—10	..
6,609,895	Stk.	Feb. 10	5/4/0	40/-	South Met. 4 p.c. Ord.	111—113	64—66	64—64½
—	—	—	—	—	Do. Pref.	..	93—95	..
1,895,445	,,	July 10	3	3%	Do. 3 p.c. Deb.	73½—74½	54—56	55½—56
224,820	,,	Feb. 26	6½	6%	South Shields Con. Stk.	157—159	124—126	..
952,795	,,	,,	6	4½%	S'th Suburb'n Ord. 5 p.c.	114—116	73—75	73½—7 7/8
60,000	,,	,,	5	5%	Do. 5 p.c. Pref.	110—112	73—75	..
135,000	—	—	—	4½%	Do. West Kent	..	..	..
187,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	84—86	..
647,740	,,	May 14	5	5%	Southampton Ord.	99—102	75—77	..
120,000	,,	Feb. 12	7½	5½%	Tottenham District { A 5 p.c.	135—138	90—95	91½—92
782,275	,,	,,	6	4½%	B 3½ p.c.	115—117	68—70	..
181,255	,,	June 26	4	4%	4 p.c. Deb.	87—89	61—63	62—62½
182,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	60—65	..
286,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	103½—109½	87½—88½*	..
80,000	,,	Feb. 26	8⅜	67/6	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	151—156	108—113	..
265,686	,,	,,	6¾	52/6	Do. B 3½ p.c.	129—134	90—95	..
108,075	,,	,,	5/17/3	47/3	Do. C 3½ p.c.	116—115	82—87	..
352,000	,,	,,	6⅔	46/3	Wimbledon 5 p.c.	117—122	82—87	..
98,000	,,	,,	6¾	52/6	Epsom 5 p.c.	121—126	91—96	..
88,416	,,	June 26	3	3%	3 p.c. Deb. Stk.	66—69	49—52	..

* Ex Div.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

Manager. Ayr Gas Company. Applications by March 31.
Resident Superintendent. No. 6424.
Commercial Assistant (Distribution). Halifax Gas Department. Applications by March 30.
Working Manager. Larne Gas Company. Tenders by April 10.
General Foreman. No. 6427.
Foreman. No. 6429.
General Fitter. Leek Gas-Works.
Junior to Assist in Laboratory and Drawing Office. Hornsey Gas-Works.

Appointments, &c., Wanted.

Office Work or Travelling (Fire-Clay Trade). No. 6419.
Manager or Manager and Secretary. No. 6389.

Plant, &c. (Second-Hand) Wanted.

Gasholder, Test. No. 6426.
Gasholder (200 to 300 ft.). Swan, Hunter, and Wigham Richardson, Ltd., Wallsend-on-Tyne.
Water Gas Plant. No. 6425.

Pitch Wanted.

Tenders to No. 6423.

Meeting.

British Gas Light Company. No. 11, George Yard, Lombard Street, E.C. March 27. Twelve o'clock.

TENDERS FOR

Coal.

Louth Gas Company. Tenders by April 5.

Cylinders, Compressed Gas.

Tenders to Messrs. Garland, Smith, & Co, by March 27.

Tar.

Leigh Gas Department. Tenders by March 28.

Thorium and Cerium.

Prize Court Sale. Tenders to Admiralty Marshal, Royal Courts of Justice, by March 26.

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